VALIDATION REPORT

SF6 RECOVERY AND RECLAMATION PROJECT, SOUTH KOREA

REPORT NO. 2010-1108

REVISION NO. 01

DET NORSKE VERITAS

VALIDATION REPORT

Date of first issue:	ConCert Project No.:	
2009-09-08	PRJC-147143-20090-CCS-NOR	
Recommended for approval: Kumaraswamy Chandrashekara	Approved by: Trine Kopperud	Organisational unit: DNV Climate Change and Environmental Services
Client: EcoSecurities International Ltd.		Client ref.: Aude Dusquesne

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CERTIFICATION AS

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Summary:

Project Name: SF_6 recovery and reclamation project, South Korea
Country: Republic of Korea
Methodology: AM0079
Version: 02
GHG reducing Measure/Technology: Recovery of SF_6 from gas insulated electrical equipment in testing facilities
ER estimate: 165 092 tCO_2e per year (average)
Size
☒ Large Scale
☐ Small Scale
Validation Phases:
☒ Desk Review
☒ Follow up interviews
☒ Resolution of outstanding issues
Validation Status
☐ Corrective Actions Requested
☐ Clarifications Requested
☒ Full Approval and submission for registration
☐ Rejected

In summary, it is DNV's opinion that the project activity "SF6 recovery and reclamation project, South Korea" in Republic of Korea, as described in the PDD, version 06.1 of 06 October 2010, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AM0079, version 02. Hence, DNV requests the registration of the project as a CDM project.

Report No.:	Subject Group:
2010-1108	Environment

Report title:
SF_6 recovery and reclamation project, South Korea

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Work verified by:
Kumaraswamy Chandrashekara

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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certificate of Emission Reductions
CL	Clarification request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DNA	Designated National Authority
DNV	Det Norske Veritas
DOE	Designated Operating Entity
EB	Executive Board of the UNFCCC
ESL	EcoSecurities International Ltd.
FAR	Forward Action Request
GCB	Gas Circuit Breakers
GHG	Greenhouse gas(es)
GIEE	Gas Insulated Electrical Equipment
GIS	Gas Insulated Switchgears
GWP	Global Warming Potential
HQ	Headquarters
IEC	International Electrotechnical Commission
IPCC	Intergovernmental Panel on Climate Change
KERI	Korea Electrotechnology Research Institute
KOLAS	Korea Laboratory Accreditation Scheme
LoA	Letter of approval
NCV	Net Calorific Value
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
PO	Purchase Order
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
SFK	Solvay Fluor Korea Co. Ltd
tCO_2e	Tonnes of CO_2 equivalents
UNFCCC	United Nations Framework Convention on Climate Change

1 EXECUTIVE SUMMARY – VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the project activity "SF6 recovery and reclamation project, South Korea" The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host Party criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfilment of stated criteria.

The host Party is Republic of Korea and the Annex I Party is United Kingdom of Great Britain and Northern Ireland. Both Parties fulfill the participation criteria and have approved the project and authorized the project participants Solvay Fluor Korea Co. Ltd and EcoSecurities International Limited. The DNA from Republic of Korea confirmed that the project assists in achieving sustainable development.

The project correctly applies the baseline and monitoring methodology AM0079, version 02 "Recovery of SF_6 from gas insulated electrical equipment in testing facilities".

The project activity consists of the recovery and reclamation of contaminated SF_6 gas, used in the testing of high and ultra-high voltage equipment (Gas Insulated Electrical Equipment - GIEE), which otherwise would have been vented after completing the electrical testing of the GIEE. As a result, the project results in reductions of SF_6 emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the project are estimated to be on the average 165 092 tCO_2e per year over the selected 10 year fixed crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

The monitoring plan provides for the monitoring of the project's emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is DNV's opinion that the project participants are able to implement the monitoring plan.

In summary, it is DNV's opinion that the project activity "SF6 recovery and reclamation project, South Korea", as described in the PDD, version 06.1 dated 06 October 2010, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AM0079, version 02. Hence, DNV requests the registration of the project as a CDM project activity.

Oslo, 2010-11-02

Michael Lehmann

CDM Validator

Oslo, 2010-11-29

Trine Kopperud

Head of Section

Det Norske Veritas Certification AS

2 INTRODUCTION

EcoSecurities International Ltd. has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the "SF6 recovery and reclamation project, South Korea" (hereafter called "the project"). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, and the subsequent decisions by the CDM Executive Board.

2.1 Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AM0079 /3/. The validation was based on the recommendations in the Validation and Verification Manual /7/.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

3 METHODOLOGY

The validation consisted of the following three phases:

I a desk review of the project design documents

II follow-up interviews with project stakeholders

III the resolution of outstanding issues and the issuance of the final validation report and opinion.

The following sections outline each step in more detail.

3.1 Desk review of the project design documentation

The following tables list the documentation that was reviewed during the validation.

3.1.1 Documentation provided by the project participants

/1/ EcoSecurities International Ltd.: CDM-PDD for "SF_6 recovery and reclamation project, South Korea",
- Version 01 dated 22 May 2009
- Version 2.4 dated 17 February 2010
- Version 03.5 dated 9 August 2010
- Version 5 dated 1 September 2010
- Version 06 dated 13 September 2010
- Version 06.1 dated 6 October 2010

/2/ Project PDD (/1/), Annex 6, reference 3.1 SF_6 Korea Stakeholder Report_(LL_NS)_14May.09

/10/ Rudolf Möck, DILO Armaturen und Anlagen GmbH, 8.13 dilo compressor lifetime.pdf, email dated 15 October 2009.

/11/ DILO Armaturen und Anlagen GmbH – Supplier's order confirmation, 8.2 DILO Compresor order confirmation date 30.11.2007.pdf, 30 November 2007.

/12/ ESL, Proposed new methodology NM0251 "Prevention of SF_6 venting following tests of Gas insulated electrical equipment", 12 november 2007

/13/ KERI, 4.1 KERI_Info about test services.pdf, brochure.

/14/ KERI, 4.2 KERI_Info about certification services.pdf, brochure.

/15/ KERI, Test records for 2007 (300 files/docs), January to December 2007

/16/ Mr. Seung-oh Yang, Deputy Genereal Manager, Technology development Center, Hyndai Heavy Industries Co. Ltd., Confirmation letter on common practice of venting SF_6 gas after testing (8.10a_VentConfirm(HyundaiHeavyIndustries).pdf), 2009.

/17/ Mr. Yun-Ho Cho, Deputy Senior Manager, H.V. Switchgear R&D Team –II, Hyosung Corporation, Confirmation letter on common practice of venting SF_6 gas after testing (8.10b_VentConfirm(Hyosung).pdf), 2009.

/18/ Sim Hwa-sub, Vice-Chief, Ultra High Voltage Design Team, LS Industrial Systems Co. Ltd.., Confirmation letter on common practice of venting SF_6 gas after testing (8.10c_VentConfirm(LS Industrial Systems).pdf), 2009.

/19/ International Electrotechnical Commission (IEC), IEC 60376 - Specification of technical grade sulfur hexafluoride (SF_6) for use in electrical equipment - Spécifications de la qualité technique de l'hexafluorure de soufre (SF_6) pour utilisation dans les

appareils électriques, This International Standard defines the quality requirements and properties for technical grade sulfur hexafluoride (SF_6) for use in electrical equipment. It covers the properties and methods of test applicable to SF_6 when this substance is supplied for use in connection with any electrical equipment. Publication Date: June 2005

/20/ SFK, Reclamation rate based on the operations between 9 July 2008 and 26 February 2009 (8.16 07.08-02.09 Used SF6 Reclamation rate.xlsx), 20 November 2009

/22/ Vehicle specification, Type of fuel (diesel) and fuel consumption (8.5 SFK Vehicle petrol consumption.pdf), 29 March 2004

/23/ http://en.wikipedia.org/wiki/Diesel_fuel

/24/ N. Serv, Hamburg, Letter to Solvay Fluor GmbH summarizing the discussions held on 7 October 2004 about CDM opportunities for SF_6 recycling ("9.2a CDM SF_6 Recycling Gespräch 07 Oct 2004.pdf" & translation), 15 October 2004.

/25/ Consultancy RCC, Presentation to SFK about the Clean Development Mechanism (9.3 Presentation by Consultancy RCC.pdf), 30 May 2006.

/26/ RCC, Communication prior to the presentation of CDM /25/ and company presentation (RCC (9.4 Copy of documents preceding RCC.pdf), 2 March 2006.

/27/ SFK' Human Resources department, SFK visitor's register/record of attendance – selected pages (9.5 Meeting with KERI.pdf), 23 August 2006 to 11 October 2007.

/28/ Bestech Co., Ltd., Quotation for a compressor for SF_6 gas (9.6 Quote requested for Compressor.pdf), 18 January 2007.

/29/ SFK, Email to Solvay's HQ summarizing CDM project prospect (9.7 Email-Blue Ocean Project CDM.pdf), 20 April 2007.

/30/ ESL, Letter of Commitment – Development of CDM for SFK's SF_6 recycling project (1.4 LOC_SFK and Ecosecurities.pdf), 12 October 2007.

/31/ SFK, Purchase Order for DILO (SF_6) compressor (1.5 PO_SFK to Recovery Equip.pdf), 23 November 2007.

/32/ Solvay GmbH, SFK's (CDM) budget approval for 2008 (9.8 CDM budget approval for 2008.pdf), 7 January 2008.

/33/ ESL & SFK, Emission Reductions Purchase Agreement – ERPA (1.6 ERPA_SFK & Eco.pdf), 19 March 2008.

/34/ SFK/KERI, SF_6 used gas filing records (6.1 start date_recovery and reclamation report_02Jun08.pdf), 2 June 2008.

/35/ ESL, Excel files with baseline reconstruction, and, project and leakage emissions calculations:

- SF6_CER Cal_V2.0_290509.xls, dated: 29 May 2009
- SF6_CER Cal_V3.0_111109.xls, dated: 11 November 2009
- SF6_CER Cal_V4.0_120210.xls, dated: 12 February 2010
- SF6_CER Cal_V4.1_170210.xls, dated: 17 February 2010
- SF6_CER Cal_V5_100618.xls, dated: 18 June 2010
- SF6_CER Cal_V5.1_100714.xls, dated: 18 June 2010
- SF6_CER Cal_V6_100913.xls, dated 16 September 2010

/36/ National Standard, Depreciation of assets (7-19-Depreciation.pdf).

/37/ Various suppliers, investment costs for the following equipment:

- SF6 Analyser (7-7-Cost of SF6 analyser.pdf)
- Piping (7-8-Cost of piping.pdf)
- Filter (7-9-Cost of separation filter unit.pdf)

- DILO Compressor (7-10-Cost of DILO compressor.pdf)
- Piping (7-11-Cost of piping.pdf)
- Price of 10 Cylinders (7-12-Unit price of cylinders.pdf)

/38/ SFK & KERI, various internal company costs:
- Labour cost (7-1-CDM Labour Cost.pdf)
- Laboratory (SFK) (7-2-Lab Cost for analysis of re-use SF6.pdf)
- Transport (7-3-Transport costs.pdf)
- Chemicals for SF6 Purification (SFK)
  (7-4-Material consumption for purification of SF6.pdf)
  (7-4-Material consumption for purification of SF6_v 2.xls)
- Additional Operational Costs for reprocessing used SF6 (SFK) (7-5-Costs of additional tools and devices.pdf)

/39/ SFK, financial analysis of proposed CDM project activity "SFK_FinancialAnalysis":
- 7-27-SFK_Financial Analysis_V1.0_220509.xls, dated: 22 May 2009
- SFK_FinancialAnalysis_v01.5_061109.xls, dated: 6 November 2009
- SFK_FinancialAnalysis_v01.6_100617.xls, dated: 17 June 2010
- SFK_FinancialAnalysis_v01.8_100716.xls, dated: 16 July 2010
- SFK_FinancialAnalysis_v01.9_100830(PF).xls, dated 30 August 2010
- SFK_FinancialAnalysis_v02_100913(PF).xls, dated 16 September 2010

/40/ Bloomerg Finance L. P. for Solvay SA, WACC Bloomerg calculation report for Q3 2007 (7-25-Solvay SA WACC Bloomber Q3 2007.tif), 31 October 2007.

/41/ Government of Korea, Enforcement Ordinance on High Voltage gas, Safety Management Law, Article 3.3b (http://ww.law.go.kr/LSW/LsBdyPrint.do), 14 January 2009

/42/ The European Parliament and of the Council, Regulation (EC) no 842/2006 on certain fluorinated greenhouse gases (1.1.EC Reg 842 2006.pdf), 17 May 2006

/43/ SFK, Company presentation (4.3 SFK Intro to the company.pdf), 2007

/44/ Korean business registry, SFK incorporation notice (4.5_12_Jul_05-SFK incorporated.pdf), 12 July 2005

/45/ SFK, KERI & ESL, References and evidences to various aspects of the project activity:
1-1 EC Reg 842 2006- the European Parliament and of the Council of 17 May 2006
1-2 SF6 Qaulity standard IEC 60376
1-3 Enforcement Ordinance on High Voltage Gas. Safety Management Law. Article 3, 3-b. January 14, 2009.
1-4 Letter of Commitment between EcoSecurities Group PLC and Solvay Fluor Korea Co., LTD dated 12th October 2007
1-5 Purchase Order (PO) made by Solvay Fluor Korea Co., LTD to DILO Armaturen und Antagen GmbH dated 23 November 2007
1-6 ERPA between EcoSecurities Group PLC and Solvay Fluor Korea Co., LTD dated 19/03/2008
2-1 KERI Guidance-SF6_Gas_Amount_Calculation
2-2 KERI pictures of tested equipment(2007)
2-3 KERI Type Test Certificate-example
2-4 KERI_raw_data test-example
2-5. Baseline reconstruction for 2007
3-1 SF6 Korea Stakeholder Report_(LL_NS)_14.05.09
4-1 KERI_Info about test services

4-2 KERI_Info about certification services
4-3 SFK Intro to the company
4-4 SFK SF6 project Introduction_26.08.08
4-5_12_Jul_05-SFK incorporated
4-6_May_06-Start of construction
4-7_May_07-Start of production
4-8 Standard specification for Sulfur Hexafluoride
5-1 SF6 process diagram including purge point
6-1 start date_recovery and reclamation report_02Jun08
7-01-CDM Labour Cost
7-02-Lab Cost for Analysis
7-03-Transport Costs
7-04-Material consumption for purification of SF6_v 2.xls
7-06-Cost of destruction of SF6.pdf
7-13-Piping to incineration company site.pdf
7-14-Monitoring equipment for incineration piping.pdf
7-15-Price of sulphur.pdf
7-16-Price of AHF.pdf
7-17-Electricity tariff.pdf
7-18-Steam tariff.pdf
7-20-Income tax.pdf
7-21-VAT.pdf
7-22-Interest rate.pdf
7-23-Average SF6 price.pdf
7-24-Exchange rate.pdf
7-25-Solvay SA WACC Bloomber Q3 2007 Solvay SA's Weighted Average Cost of Capital. Bloomberg Finance LP. Bloomberg Professional Service. October 31, 2007.
7-26-Solvay - plant data request.xls
7-26-Solvay - plant data request_v 2.xls
7-27-SFK_Financial Analysis_V1.0_220509.xls /39/
7-28 SF6_Korean market price Trend_05-09.doc
7-29 2005_06_22_FluorOnsan_EN.pdf
7-30 BoK Financial Stability Report Oct-2007.pdf
8.01 Onsan 2008 Production summary-CONFIDENTIAL.pdf
8.02 DILO Compresor order confirmation date 23.11.2007.pdf
8.04 SFK Customer segmentation-CONFIDENTIAL.pdf
8.05 SFK Vehicle petrol consumption.pdf
8.06_1_SFK Salary ranges.pdf
8.06_2_SFK Salary calculation.pdf
8.07 SFK Steam tariff.pdf
8.09 Z5_Z3 Price.pdf
8.10a_VentConfirm(HyundaiHeavyIndustries).pdf
8.10b_VentConfirm(Hyosung).pdf
8.10c_VentConfirm(LS Industrial Systems).pdf
8.11-Price of sulfur 2006.pdf
8.13 dilo compressor lifetime.pdf

8.14 Solvay, DILO, Linde - SF6 reuse brochure.pdf
8.15 SF6 process including purge point with arrow.xls
8.16 07.08-02.09 Used SF6 Reclamation rate.xlsx
8.17 LS Industrial Systems PTTI.pdf
8.18 SFK_plant capacity.pdf
8.19 SFK_SF6 Reclamation Data_30 Mar 10.xls
8.20 SFK_SF6 Transport Invoice.pdf
8.21 SFK_SF6 Injection Rate.pdf
8.22 SFK_2009 Production Report.xls
8.23 SFK_SF6 sales invoice_19 Mar 10.pdf
8.24 SFK_Project definition_15Jun10.pdf
8.25 SFK_ 2007 Production Report.pdf
8.26 SFK_electricity consumption_May07 to Aug07.pdf
8.27 SFK_2007 Production Report_Raw material.pdf
8.28 SFK_electricital diagram.pdf
8.29 SFK_Steam Invoice.pdf
8.30 SFK_SOP_Reclamation Rate.pdf
8.31 SF6_Benchmark Confirmation.pdf
8.31 SFK_Purchase Order_DILO Compressor.pdf (Korean)
8.33 SFK_F1EC_financial analysis.pdf

/46/ ESL, response to CAR4 CL5.pdf, 2010

/47/ Solvay S.A., Evidence that SFK is a wholly owned subsidiary of Solvay S.A. (7-29 2005_06_22_FluorOnsan_EN.pdf), 22 June 2005

/48/ SFK, Email communication - Presentation of the proposed project activity to the consideration of the management Solvay S.A. (Mother Company) (9.7 Email-Blue Ocean Project CDM.pdf), 20 April 2007.

/49/ Solvay S. A., Email communication – SFK's Investments budget approval- including the proposed CDM project activity (9.8 CDM budget approval for 2008.pdf), 8 January 2008.

/50/ Bank of Korea, Financial Stability Report (7-30 BoK Financial Stability Report Oct-2007.pdf), October 2007

/52/ LS Industrial Systems, Marketing brochure (8.17 LS Industrial Systems PTTI.pdf).

/53/ ESL & SFK, Monitor guidance flowchart (1_01 SF6 project_CDM Monitoring Guidance_AM0079_v01-v07.xls), November 2009.

/54/ SFK & KERI, KERI's CDM Standard Operating Procedures:
KERI-SOP-CDM-001_Rev.00.pdf
KERI-SOP-CDM-002_Rev.01.pdf
KERI-SOP-CDM-003_Rev.01.pdf
KERI-SOP-CDM-004_Rev.00.pdf
KERI-SOP-CDM-005_Rev.00.pdf

/55/ SFK, CDM Standard and Specific Operation Procedures:
SFK-SOP-CDM-001_Rev.01.pdf
SFK-SOP-CDM-002_Rev.00.pdf
SFK-SOP-CDM-003_Rev.00.pdf
SFK-SP61(Rev.00)_CDM사업관리.pdf
SFK-SP61-A(Rev.00)_HCC Bundle 관리대장.pdf
SFK-SP61-B(Rev.00)_재생품의서.pdf

SFK-SP61-C(Rev.00)_재생완료보고서.pdf
SFK-SP61-D(Rev.00)_CDM월보.pdf
SFK-SP61-E(Rev.00)_SF6 회수설비 일일 점검표.pdf
SFK-SOP-SF6-086
Instrument specification:

- "Spec of instrument related CDM(analyzer).xls"
- "Magnetic float level gauge.pdf"
- "pressure gauge.pdf"
- "temperature gauge.pdf"

/56/ KOLAS, Weighing scale (Mettler Toledo) calibration certificate, (PERF.pdf), 29 October 2008

/57/ SFK, SF_6 market price trends (7.28 SF6_Korean market price Trend_05-09.doc), May 2009

/58/ SFK, Onsan 2008 production summary (8.1 Onsan 2008 Production summary-CONFIDENTIAL.pdf), 2009), May 2009

/59/ SFK, SF_6 invoices showing the sales price per kg of SF_6 (files "8.23 SFK_ SF6 sales invoice_19 May 10.pdf" & "SF6 Invoices_2007_2008.pdf"), dated: 2010 & 2007-2008 respectively.

/60/ Citibank, Panalpina Welttransport GmbH, DILO-Armaturen und Anlagen GmbH, Shipment documentation, invoice no. 49819 and order confirmation for 1 set SF_6 handling equipment ("8.2 DILO Compressor order confirmation date 30.11.2007.pdf", dated: 14 April 2008, 9 April 2008, 9 April 2008 and 30 November 2007 respectively.

/61/ SFK, Internal production report (8.25 SFK_ 2007 Production Report.pdf), dated: 2007

/62/ SFK, Internal report on SFK's electricity consumption (8.26 SFK_electricity consumption_May07 to Aug07.pdf), dated 10 June 2010.

/63/ SFK, Internal report on consumption of raw materials (8.27 SFK_2007 Production Report_Raw material.pdf), dated: 2007

/64/ SFK, Internal document on expected return on Investment ("Benchmark.pdf"), dated 16 Jun 2010

/65/ SFK, K2 Project Definition, Excerpt from the SF_6 production facility's project definition stating that the maximum SF_6 theoretical capacity of the plant is 1500 tonnes/year ("8.18 SFK_plant capacity"), version 5.4, date: Apr 2006.

/66/ 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 SF_6 gas.

/67/ SFK, Financial analysis of Solvay's F1EC project ("8.33 SFK_F1EC financial analysis.pdf").

/70/ SFK: "2009 SF6 Production Report" (8.22 SFK_2009 Production Report.xls) Date: January 2010.

/71/ SFK & ESL, References and evidences to various aspects of the validation:
9.1 SFK-CDM timeline v01.xls
9.2a CDM SF6 Recycling Gespräch 07 Oct 2004.pdf
9.2b CDM SF6 Recycling Gespräch 07 Oct 2004-Translation.doc
9.3 Presentation by Consultancy RCC.pdf
9.4 Copy of documents preceding RCC.pdf
9.5 Meeting with KERI.pdf
9.6 Quote requested for Compressor.pdf

9.7 Email-Blue Ocean Project CDM.pdf
9.8 CDM budget approval for 2008.pdf
Calibration certificate – weight scale for the cylinders. "PERF.pdf"
Equipment invoices:
MRGas_Flowmeter.pdf
MSGas_Weighing scale.pdf
QSF6_Flowmeter.pdf
Benchmark.pdf
DILO_Package order.pdf
SF6 Invoices_2007_2008.pdf

/72/ Documentation regarding accreditations issued by KOLAS to Korean laboratories testing electrical equipment, and uniqueness of KERI's certification for testing of ultra high voltage electrical equipment:
KERI.pdf
KERI_UniqueLab.docx
KESCO.pdf
KESRI.PDF
PTNT.pdf

/73/ SF_6 gas filing records CDM08001-06 & CDM 09001

/74/ International Electrotechnical Commission (IEC), IEC 60480 - Guidelines for the checking and treatment of sulfur hexafluoride (SF6) 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)

3.1.2 Letters of approval

/69/ Government of Republic of Korea, Environment Cooperation Division, under the Ministry of Foreign Affairs and Trade (Ministry of Kowledge Economy/ Ministry of Environment): Letter of approval, (Korean and English versions) dated: 14 April 2010

/68/ Department of Energy & Climate Change (DNA of UK): Letter of Approval, dated: 29 April 2010

3.1.3 Methodologies, tools and other guidance by the CDM Executive Board

/3/ CDM Executive Board: Approved baseline and monitoring methodology AM0079, "Recovery of SF6 from Gas insulated electrical equipment in testing facilities"

- AM0079 version 01
- AM0079 version 02

/4/ CDM Executive Board: Methodological Tool "Combined tool to identify the baseline scenario and demonstrate additionality", version 02.2

/5/ CDM Executive Board: Methodological Tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption", version 01

/6/ CDM Executive Board: Methodological Tool "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion", version 02.

/7/ CDM Executive Board: "Validation and Verification Manual", version 01.1 and 01.2

/8/ CDM Executive Board: "Guidance on the Demonstration and Assessment of Prior consideration of the CDM", version 03, EB49, Annex 22.

/9/ CDM Executive Board: "Glossary of CDM terms", version 04

/51/ CDM Executive Board: Guidelines on the Assessment of Investment Analysis – Version 03, EB51 Annex 58.

3.1.4 Documentation used by DNV to validate / cross-check the information provided by the project participants

/21/ IPCC, Guidelines for National Greenhouse Gas Inventories, 2006

3.2 Follow-up interviews with project stakeholders

During 17-19 June 2009 DNV visited the Korea Electrotechnology Research Institute (KERI) and Solvay Flour Korea Co., Ltd. (SFK) facilities and performed interviews with project stakeholders.

	Date	Name	Organization	Topic
/I01	2009-06-17	Mr. Yong Han LEE Manager / High power testing Development 1, High power High voltage Testing & Evaluation Division	Korea Electrotechnology Research Institute (KERI) (Recovery site)	Waste SF_6 gas recovery process at KERI's facilities.
/I02	2009-06-17	Mr. Hak Dong YOON Senior Engineer / High power testing Development 1, Testing & Certification Service	Korea Electrotechnology Research Institute (KERI) (Recovery site)	Investigation of previous practices for handling waste SF_6 gas used in the testing the electrical equipment at KERI's facilities.
/I03	2009-06-17	Mr. Ike Sun CHOI Senior Engineer / High power testing Development 1, Testing & Certification Service	Korea Electrotechnology Research Institute (KERI) (Recovery site)	Investigation of previous practices for handling waste SF_6 gas used in the testing the electrical equipment at KERI's facilities.
/I04	2009-06-18	Mr. Seung Bong CHOI Site Manager	Solvay Flour Korea Co., Ltd (SFK) (Reclamation	The company and the CDM project in general

			site)	
/I05	2009-06-18	Mr. Dae Jun HAN Team Manager / Supply chain Team	Solvay Flour Korea Co., Ltd (SFK) (Reclamation site)	The CDM project in general
/I06	2009-06-18	Mr. Ho Jin CHEON Manager / CDM TFT	Solvay Flour Korea Co., Ltd (SFK) (Reclamation site)	Detailed review of the CDM project
/I07	2009-06-18	Mr. Jin Young CHOENG Assistant Manager / QC Team	Solvay Flour Korea Co., Ltd (SFK) (Reclamation site)	Detailed review of the CDM project with emphasis in the QC system.
/I08	2009-06-18	Mr. Seo Hee SON Foreman	Solvay Flour Korea Co., Ltd (SFK) (Reclamation site)	Operational procedures in regarding the extraction of waste SF_6 form the cylinders and reclamation process.

DNV performed a second site visit to SFK facilities on 16 June 2010, with the purpose of validating the information presented in the responses of the PP to the clarifications CL38, CL39, CL40, CL41, CL42, CL43, and CL44. The people interviewed were:

	Date	**Name**	**Organization**	**Topic**
/I09	2010-06-16	Mr. Yong Han LEE Manager / High power testing Development 1, High power High voltage Testing & Evaluation Division	Korea Electrotechnology Research Institute (KERI) (Recovery site)	CDM project in general and uniqueness of KERI's activities in testing of ultra-high voltage equipment.
/I10	2010-06-16	Mr. Hak Dong YOON Senior Engineer / High power testing Development 1, Testing & Certification Service	Korea Electrotechnology Research Institute (KERI) (Recovery site)	CDM project in general and uniqueness of KERI's activities in testing of ultra-high voltage equipment.

/I11	2010-06-16	Mr. Seung Bong CHOI Site Manager	Solvay Flour Korea Co., Ltd (SFK) (Reclamation site)	The SFK company and the CDM project in general
/I12	2010-06-16	Mr. Ho Jin CHEON Manager / CDM TFT	Solvay Flour Korea Co., Ltd (SFK) (Reclamation site)	Detailed review of the CDM project.
/I13	2010-06-16	Mr. Pablo Fernandez Regional Implementation Manager of South East Asia	EcoSecurities Malaysia Sdn. Bhd.	Detailed review of the CDM project.
/I14	2010-06-16	Mr. Erik Chan Sourtheast Asia Regional Director	EcoSecurities	CDM project in general
/I15	2010-06-16	Ms. Kharlamara P. Lariosa Project Manager-Monitoring and Verification	EcoSecurities	Detailed review of the CDM project.
/I16	2010-06-16	Ms. Myungnam(Lise) Lee Director,	Park Island Energy	CDM project in general

3.3 Resolution of outstanding issues

The objective of this phase of the validation is to resolve any outstanding issues which need be clarified prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol was customised for the project. The protocol shows in a transparent manner the criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of four tables. The different columns in these tables are described in the figure below. The completed validation protocol for the project activity "SF6 recovery and reclamation project, South Korea" is enclosed in Appendix A to this report.

A corrective action request (CAR) is raised if one of the following occurs:

(a) The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;

(b) The CDM requirements have not been met;

(c) There is a risk that emission reductions cannot be monitored or calculated.

A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A forward action request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the CDM requirements for registration.

Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities		
Requirement	***Reference***	***Conclusion***
The requirements the project must meet.	*Gives reference to the legislation or agreement where the requirement is found.*	*This is either acceptable based on evidence provided (**OK**) or a **corrective action request (CAR)** if a requirement is not met.*

Validation Protocol Table 2: Requirement Checklist				
Checklist question	***Reference***	***Means of verification (MoV)***	***Assessment by DNV***	***Draft and/or Final Conclusion***
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the CDM-PDD	*Gives reference to documents where the answer to the checklist question or item is found.*	*Means of verification (MoV) are **document review (DR)**, **interview (I)** or any other follow-up actions (e.g., on site visit and telephone or email interviews) and **cross-checking (CC)** with available information relating to projects or technologies similar to the proposed CDM project activity under validation.*	*The discussion on how the conclusion is arrived at and the conclusion on the compliance with the checklist question so far.*	*OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements. A **corrective action request (CAR)** is raised when project participants have made mistakes, the CDM requirements have not been met or there is a risk that emission reductions cannot be monitored or calculated. A **clarification request (CL)** is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. A **forward action request (FAR)** during validation is raised to highlight issues related to project implementation that require review during the first verification of the project activity.*

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Corrective action and/ or clarification requests	***Ref. to checklist question in table 2***	***Response by project participants***	***Validation conclusion***
*The **CARs** and/ or **CLs** raised in Table 2 are repeated here.*	*Reference to the checklist question number in Table 2 where the CAR or CL is explained.*	*The responses given by the project participants to address the CARs and/or CLs.*	*The validation team's assessment and final conclusions of the CARs and/or CLs.*

Validation Protocol Table 4: Forward Action Requests		
Forward action request	***Ref. to checklist question in table 2***	***Response by project participants***
The FARs raised in Table 2 are repeated here.	*Reference to the checklist question number in Table 2 where the FAR is explained.*	*Response by project participants on how forward action request will be addressed prior to first verification.*

Figure 1: Validation protocol tables

3.4 Internal quality control

The validation report underwent a technical review performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3.5 Validation team

				Type of involvement						
Role	***Last Name***	***First Name***	***Country***	Administrative	Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	Sectoral competence
Project manager	Chavez V.	Francisco	Norway	✓						
Technical team leader (CDM validator)	Lehmann	Michael	Norway		✓		✓	✓		
GHG auditor	Kwak	Seung Hyun	S. Korea		✓	✓	✓			
GHG auditor (trainee)	Chavez V.	Francisco	Norway		✓	✓	✓			
Sector expert	Lin	Chun Nan	Taiwan		✓	✓	✓			✓
Technical reviewer	Chandrashekara	Kumaraswamy	India						✓	

The qualification of each individual validation team member is detailed in Appendix B to this report.

4 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The final validation findings relate to the project design as documented and described in the PDD, version 06.1 dated 06 October 2010.

4.1 Participation requirements

The project participants are Solvay Fluor Korea Co. Ltd., of Republic of Korea and EcoSecurities International Ltd., of United Kingdom of Great Britain and Northern Ireland. The host Party (Republic of Korea) and the Annex I Party (United Kingdom of Great Britain and Northern Ireland) meet all relevant participation requirements.

The Parties involved in the proposed project activity are the Republic of Korea (host Party), and the United Kingdom of Great Britain and Northern Ireland. The project participants are: Solvay Fluor Korea Co. Ltd, and EcoSecurities International Limited.

Both Parties have ratified the Kyoto Protocol and have a designated national authority (DNA). The DNA of the Republic of Korea is the Environment Cooperation Division, under the Ministry of Foreign Affairs and Trade, while the DNA of the United Kingdom is the office for Global Carbon Markets, under the Department of Energy and Climate Change.

The letters of approval /69/ /68/ were received from the project participants. The letters of approval confirm that both Parties are a Party to the Kyoto Protocol and that participation is voluntary. The Letter of Approval from the DNA of the Republic of Korea /69/ confirms that he proposed CDM project activity contributes to the sustainable development of the country. The DNA of United Kingdom of Great Britain and Northern Ireland issued the LoA /68/ on 29 April 2010 and authorized EcoSecurities International Limited as project participant. The letters of approval refers to the precise proposed CDM project activity title in the PDD being submitted for registration. DNV was able to confirm that the letters of approval have been issued by the respective Parties' DNA. DNV does not doubt the authenticity of the letter of approval. DNV considers the letters are in accordance with paragraphs 45- 48 of the VVM /7/.

The proposed project does not involve any public funding and DNV did not come across any information indicating that the project result in a diversion of official development aid

4.2 Project design

The "SF_6 recovery and reclamation project, South Korea" was developed by Solvay Fluor Korea Co. Ltd (SFK) and the Korea Electrotechnology Research Institute (KERI) and it is a sulphur hexafluoride (SF_6) recovery and reclamation project in the Republic of Korea.

The respective coordinates for the location of these facilities are as follows:

- Solvay Fluor Korea Co. Ltd: 383, Daejung-Ri, Onsan-Eup, Ulju-kun, Ulsan. Coordinates: Latitude 35.426374 Longitude 129.340193

- Korea Electrotechnology Research Institute (KERI): 28-1 Seongju-dong, Changwon-si, Gyeongsangnamdo. Coordinates: Latitude 35.189363 Longitude 128.718224

The purpose of this project activity is to reduce emissions of SF_6 gas from the KERI testing facility, by recovering the waste SF_6 gas used in the testing of gas insulated electrical equipment (GIEE), especially gas circuit breakers (GCB) and gas insulated switchgears (GIS), and then reclaiming it at Solvay's SF_6 manufacturing facility located in Ulsan, South Korea. The purpose and design of the Project is in accordance with the approved methodology AM0079 /3/.

According to specific industry standards, some high voltage electrical equipment shall be filled with SF_6 gas - with specific levels of purity as indicated by the International Electrotechnical Commission standard IEC 60376 /19/) - prior to being subjected to electrical testing. Manufacturers of GIEE normally request these tests for either: certification or design, and these can be performed by KERI.

KERI was established in 1976, and is accredited by the Worldwide System for Conformity Testing and Certification of Electrotechnical Equipment and Components (International Electrotechnical Commission for Electrical Equipment - EIECEE) as a Certification Body Test Laboratory.

KERI is equipped with modern high voltage and high power testing facilities capable of performing short-circuit and breaking test up to 1100kV/63kA. Electrical apparatus that can be tested include switchgears, circuit breakers, transformers and fuses.

During some of the high power tests performed in GIS and GCB equipment insulated using SF6 gas occurs electric arcing which may affect the integrity of the gas (contamination of the gas). Therefore, it is likely that the level of purity of SF_6 gas within the equipment may not be as required by the standards of the test. Thus, if the equipment in question requires further testing that requires filling the equipment with SF_6 gas, the used (waste) gas has to be replaced by new gas. Also, if the equipment has to be disassembled for any reason, the gas will have to be drained from the equipment prior to start disassembling it.

On either of these two situations described, the normal practice has been to vent the SF_6 gas to the atmosphere (emissions). The project activity has the objective to stop this emission of SF_6 by recovering it from the electrical equipment tested at KERI's facilities (recovery site), and reclaiming it by injecting it in the production line of new SF_6 at Solvay's site (reclamation site).

In the apparently remote cases where the contamination of the gas is too high the gas will be disposed of by incineration (the incineration process although does not represent an ideal solution, it reduces the greenhouse effect of the highly contaminated SF_6 gas).

Solvay is a modern company that produces new SF_6 gas from raw materials. The waste SF_6 gas drained from the electrical equipment will be stored at KERI's in specifically designed cylinders (bundle of 2 cylinders). Once the cylinders are full, the cylinder bundle is transported to Solvay's premises where the gas is tested to determine the level of contamination. If the contamination levels are acceptable, the gas is then injected into the production line to be reprocessed to meet the requirements of the standard IEC 60376 ("new"

gas). If the contamination level is too high to be reprocessed the gas from the cylinders will be incinerated.

The expected operational lifetime of the project activity used in the investment analysis is 20 years (as per the manufacturer's information /10/), with replacement of the equipment as per the individual lifetime of each one of them.

Based on the site visit, it was verified that the technology used in the project reflects good practise, which is consistent with the other business activities of both companies (Solvay and KERI).

The PP has chosen a crediting period of 10 years, upon which assuming a timely project registration as CDM project, is intended to have the crediting period starting in 1 March 2011, or the date of registration of the project as a CDM project activity, what ever is later.

The project start date is the date of the real action of the project activity which corresponds to the purchase order of the DILO compressor issued by SFK on 23 November 2007 /31/, and confirmed by the supplier via the order confirmation issued by the manufacturer DILO Armaturen und Anlagen GmbH /11/. The project activity starting date is then 23 November 2007 which is the earliest date at which either the implementation or construction or real action of a project activity begins /31/.

In summary, DNV has performed two site visits (the first one on 17-18 June 2009 to both SKF and KERI facilities, and the second one on 16 June 2010 to SFK facilities only) to inspect the project site, the equipment and related installations, and its description presented in the PDD /1/ and related/supporting documentation presented in the List of References (Annex 6), and to interview some of the personnel involved in the project activity from each of the 2 companies (namely, SFK & KERI). Furthermore, DNV has reviewed in detail the supporting documentation to verify the correctness and genuinity of the evidences and calculations presented. DNV considers the project description of the project contained in the PDD to be complete and accurate, and the PDD complies with the relevant forms and guidance for completing the PDD.

4.3 Application of selected baseline and monitoring methodology

The project applies the baseline methodology AM0079, version 02, which is linked to the sectoral scope: "Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride". The approved methodology AM0079 is based on the proposed new methodology NM0251 "Prevention of SF_6 venting following tests of Gas insulated electrical equipment" /12/ prepared and proposed to the EB by the project participant of the project in question. Based on this proposed methodology, the first version of AM0079, version 01, was approved, and the first version (version 01) of the PDD /1/, was developed upon this first version of the methodology. Following a request for revision of AM0079 by the project participants of the project in question, version 02 of AM0079 /3/ was approved by the EB.

This methodology applies to projects where SF_6 emissions are reduced by implementing recovery of used SF_6 gas that would be vented after the testing of gas insulated electrical equipment (GIEE) at a testing facility, called the SF_6 recovery site. In the case of the proposed project activity, the SF_6 recovery site is at KERI's site (applicability condition fulfilled). Then the recovered gas is reclaimed at an SF6 production facility, called the SF6 reclamation site,

which in the case of the proposed project activity, the SF_6 gas is reclaimed at SFK's production facility (condition fulfilled).

Furthermore, all applicability conditions are met:

Applicability criteria	Project compliance
The SF_6 recovery site uses SF_6 in the testing of gas insulated electrical equipment (GIEE) (e.g. circuit breaker, switchgear). Such tests are performed as part of a certification or rating process, or during production or development of new electrical equipment. /3/	The Korea Electrotechnology Research Institute (KERI), the recovery site of the proposed project activy, is an accredited High Power and High Voltage Testing Facility providing testing and certification services for GIEE /13/ /14/, where SF_6 is used in the testing of GIEE.
The testing considered for the project is Electrical Tests of medium and high voltage rated equipment (>1kV) /3/	Tests to be considered at the KERI site for this project include equipment from >1kV and suitable records are available/14/.
Before the project, SF_6 gas used in the equipment for tests is vented following testing /3/	Before the project, KERI's customers have been routinely venting the used SF_6 from equipment after the completion of the various electrical tests /16/ /17/ /18/, and refill the equipment with new SF_6 for the execution of new tests (the installation and removal of the electrical equipment within the testing facilities, and as well as the filling and venting of SF_6 gas is performed by the equipment manufacturer. KERI performs exclusively the actual electrical testing. Given that KERI is the only testing facility within the region able to perform tests that result in the contamination of SF_6 gas, then the practice exercised at KERI by its costumers of venting the contaminated SF_6 gas can be considered common practice.
There is no option to reuse the vented SF_6 in the SF_6 recovery site /3/	• Vented SF_6 is used SF_6 from the test equipment. Such contaminated SF_6 can not be used for further tests because it is no longer in accordance with IEC 60376 /19/, which is the required SF_6 gas standard for the GIEE tests /19/. • As indicated in the application for test records /15/, manufacturers that order the GIEE tests, require to test their equipment under strict adherence to the standard IEC 60376 /19/, and therefore the quality of the SF_6 gas shall have a high level purity as specified in the IEC 60376 standard /19/. • According to IEC 60480 /74/, used SF_6 gas is only suitable for re-use when equipment is maintained, repaired or reaching the end of its service life, thus it is not explicitly suitable

	for use in equipment for type tests, performance tests or tests during equipment development. In the case of KERI, the company only focuses in testing of the high and ultra high voltage equipment, and their activities do not involve maintenance or repair of such equipment /13/ /14/.
The recovered gas is reclaimed by using it as a feedstock in the production of new SF_6 on the premises of an existing SF_6 production facility /3/	As confirmed during DNV's visit to the project site, the recovered gas is reclaimed by using it as a feedstock in the production of new SF_6 on the premises of the existing SF_6 production facility at Solvay Fluor Korea Co. Ltd (SFK) site in South Korea which started operation in May 2007.
Recovered gas injected for reclamation process is directly merged with the flow of gas in the production line of SF_6 newly produced and the two becomes indistinguishable. Furthermore, there are no possible cause of leakage (e.g. purge outlets) between the point of injection and the point of merging	As confirmed during DNV's visit to the project site, the recovered gas is injected into the production line for the newly produced SF_6 gas on the premises of the existing SF_6 production facility at Solvay Fluor Korea Co. Ltd (SFK) site. DNV confirms that SFK installations has no possible causes of leakeage between the point of injection of the used SF_6 gas and the point of point of merging it with the newly produced SF_6 gas.
Reclaimed SF_6 is a minor component of the total SF_6 production of the SF_6 reclamation site (less than 5% of total production) /3/	SFK's total design production capacity of SF_6 is around 1,500 tonnes per year /65/. The reclamation rate of the proposed project activity is approximately 4.3 kg/hr of used SF_6 /20/. Assuming 7 920 hr/yr of operation /65/, the total amount of SF_6 gas reclaimed per year will be approximately 34.05 tonnes per year. Hence, the reclaimed SF_6 would represent less than 3% (more precisely 2.3%) of total SF_6 production
Issuance requests shall be formulated for periods of at least one year as the procedures to remove the possibility of gaming are designed on a yearly basis /3/	The issuance request will be formulated for periods of at least one year in order to remove the possibility of gaming (FAR 5).
The testing is performed at the request of a client according to a national or international standard, and the facility operator has no discretion in the type or frequency of tests /3/	• KERI, the testing facility operator, has not influence on the decision to select neither the test type nor the frequency of tests. KERI's customers decide such parameters as indicated in the Application for Test records /15/. • In the Application for Test records /15/ KERI's customers specify the testing protocols required for the equipment to be tested. These protocols comply with detailed

	international testing standards for defined testing requirements.
Application of the procedure to identify the baseline scenario must result in a baseline involving the venting of SF_6 as the most plausible scenario of the SF_6 recovery site /3/	In the absence of the project activity the most likely scenario is continuation of the normal practice of venting the used SF_6 gas at the recovery site /16/ /17/ /18/.

The applicability conditions of the three tools required by the methodology /3/ are also met:

Applicability criteria	**Project compliance**
"Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" /6/	During the transportation of the cylinders bundle to and from the project sites (recovery and reclamation), the project activity will cause burning fossil fuel (diesel for the transport vehicle), leakage emissions. The CO_2 emissions from the fossil fuel combustion will then be calculated based on the Tool /6/ based on the quantity of the fuel combusted and its properties. However, as demonstrated below, this emission is negligible and therefore considered to be zero.
"Combined tool to identify the baseline scenario and demonstrate additionality" /4/	As demonstrated below, all potential alternative scenarios as specified in the approved methodology AM0079 /3/, relevant to the project activity are available to project participants (could be implemented by the project participants), thus complying with the applicability criteria of the Tool /4/.
"Tool to calculate baseline, project and/or leakage emissions from electricity consumption"/5/	As indicated in the applicability criteria of the Tool /5/, if a project activity obtains all the electricity from the grid, such project activity can use this Tool in the calculations of project emissions. In the case of the proposed project activity, the electricity required for each of both sites (recover and reclamation) is supplied by the grid, thus complying with the applicability criteria of this Tool /5/.

DNV is of the opinion that the project activity fulfils the applicability criteria of the approved methodology AM0079 version 2 /3/ and the applicability conditions of the tools: "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" version 02 /6/, "Combined tool to identify the baseline scenario and demonstrate additionality" version 02,2 /4/, and "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" version 01 /5/, required by the methodology /3/.

4.4 Baseline determination

The baseline is based on the standard practice of venting the waste SF_6 gas after the testing (tests higher than 1 kV) /16/ /17/ /18/, performed in connection with the design or certification of the electrical equipment (GIEE), is completed. This is due to the prevailing conditions that the waste SF_6 gas can't be reused at the recovery site. The testing is performed at the request of a client and according to a national or international standard, and KERI (the facility operator) has no discretion in the type or frequency of tests. The PP has proceeded to construct the project and set it in operation, in order to gather enough information to determine the historical venting, which in turn, during the methodology approval process, the PP intended to use to determine the baseline emissions.

With regards to the relative amount of used SF_6 gas reclaimed with respect to the total production of new SF_6 gas, the recovered used SF_6 gas is reclaimed by using it as a feedstock in the production of new SF_6 on the premises of SFK (reclamation site). As explained before, the PP has proceeded to construct the project in 2008 in order to establish the historical values of waste SF_6 generated. According to the results of reclaimed used SF_6 gas between 9 July 2008 and 26 February 2009, the average reclamation rate is approximately 4.3 kg/hr /20/. Thus, the reclaimed SF_6 gas is approximately 2.3% from the annual production of the plant (assuming 7 920 hr/yr of operation /65/), which is less than 5% of total annual production.

To finalize the applicability analysis, it should be noticed that, as it is specified in the PDD, the PP intends to formulate the issuance requests for periods of at least one year as the procedures to remove the possibility of gaming are designed on a yearly basis. Compliance to this will be ensured via a Forward Action Request (FAR), which shall be verified during the verification missions (FAR 5). Furthermore, the baseline emissions are capped to historical production of waste SF_6 to determine the baseline and to ensure avoiding the possibility of manipulating the volumes of waste SF_6 gas generated.

The system boundaries are as defined in the methodology. The identified boundary and the selected sources and gases are justified for the project activity, and these were verified during DNV's site visit. These are: the recovery site (KERI's facilities) and the reclamation site (SFK's facilities). See table of GHG gases below.

The validation of the project activity did not reveal other greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed project activity which are expected to contribute more than 1% of the overall expected average annual emission reduction, which are not addressed by AM0079 (version 02).

The transportation of the bundles between sites is considered as a project leakage. The leakage emission is calculated as per the Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion /6/, although as demonstrated below, this emission is negligible and therefore considered to be zero in the ex-ante emission reduction forecast.

DNV is of the opinion that the determination of the baseline for the proposed project activity is reasonable and in compliance with the requirements and applicability criteria of the approved methodology /3/ and the corresponding Tools /4/ /5/ /6/.

The system emissions are summarized in the following table:

	GHGs involved	*Description*
Baseline emissions	*SF_6*	*Venting - Only source of emissions*
Project emissions	*SF_6*	*Emitted during reclamation - Only source of emissions*
	CO_2	*Energy used prior reclamation,– Main source emissions*
	SF_6	*Exceptional emissions – Only source of emissions*
	CO_2	*Recovery site, electrical equipment. – Main source emissions*
Leakage	*CO_2*	*Negligible, thus ignored during the crediting period*

The identified boundary and selected sources and gases are justified for the project activity. The validation of the project activity did not reveal other greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed project activity which are expected to contribute more than 1% of the overall expected average annual emission reduction, which are not addressed by AM0079 (version 02).

4.5 Additionality

The additionality of the proposed project activity has been demonstrated through the use of the "Combined tool to identify the baseline scenario and demonstrate additionality", version 02.2. The project fulfils the applicability conditions of the Tool, namely:

- All potential alternative scenarios presented in the methodology AM0079 /3/ to the proposed project activity are available to project participants.
- The modifications applied to the existing installation operated by project participants will result in the reduction of SF_6 emissions.

4.5.1 Evidence for prior CDM consideration and continuous actions to secure CDM status

The following table presents chronogically the steps taken by the PP to demonstrate their CDM consideration intentions regarding the proposed project activity:

Date	Event
7 October 2004	Discussion between SFK and consultancy 'N.Serve' about CDM opportunities for SF_6 recycling /24/
30 May 2006	Presentation by consultancy 'RCC' /25/ /26/
25 September 2006	Meeting KERI – SFK /27/
18 January 2007	Quotation issued for SF_6 Compressor/28/
20 April 2007	Email from SFK to Solvay HQ with summary CDM proposal /29/
12 October 2007	Letter of Commitment between EcoSecurities and SFK /30/
23 November 2007 (CDM start date)	Issuance of Purchase Order of the project equipment (Compressor) /31/
19 November 2007	Submission of New Methodology (NM0251) to the EB

7 January 2008	CDM Budget Approval for 2008 /32/
8 February 2008	Preliminary Recommendation from EB's Methodology Panel
19 March 2008	ERPA Signed between EcoSecurities and SFK /33/
2 June 2008	Start of SF_6 Recovery at KERI site /34/
25 March 2009	Methodology Approval (AM0079) /3/
14 May 2009	Signed contract with DNV for validation of the project activity

Project start date is 23 November 2007, which corresponds to the date of issuing the purchase order by SFK for the DILO (SF_6) compressor /31/, which represents the actual/real commercial commitment made by SFK with regards to the project activity (real action as per CDM requirements). Based on the above, it is DNV's opinion that the project activity complies with the requiremetns regarding prior consideration of the CDM benefits, as specified in the the Guidance on the Demonstration and Assessment of Prior Consideration of the CDM /8/.

It is DNV's opinion that the proposed CDM project activity complies with the requirements of the latest version of the guidance on prior consideration of CDM /8/.

4.5.2 Identification of alternatives to the project activity

Identification of alternatives to the project activity:

There are four (4) alternative scenarios identified during the application of the Tool:

1) Continuation of current practice where used SF_6 gases are vented to the atmosphere at the testing facility after high power tests are performed to GIEEs.
   This is the basis for the baseline of the project activity.
2) Capture and incineration of used SF_6.
   Considering that this alternative would face economic barriers as incineration does not offer any revenue, and has economic costs due to the high temperatures (and corresponding energy requirements) necessary to break down used SF_6 gas, this alternative is not an option to be pursued.
3) Capture and reclamation of used SF_6 at the chosen SF_6 reclamation site.
   This scenario is the project activity without CDM, which faces economic barriers as recovery and reclamation of used SF_6 without CDM revenues does not offer sufficient revenue to compensate for the high economic costs due to the piping and equipments that have to be purchased, installed and operated.
4) Capture and transport of used SF_6 to other facilities for reclamation.
   This alternative would require alternative facilities other than SFK to reclaim the recovered SF_6. However, no other SF_6 reclamation (production) facilities exist in the Host Country. Therefore this alternative is not considered viable. Furthermore, KERI is the only institute in Korea which can conduct the test for high voltage and high capacity GCB and GIS, as per the certifying body for this type of laboratories, KOLAS /66/.

After DNV's site visit and review of the documentation provided, DNV is of the opinion that all the plausible alternative scenarios have been considered by the PP within the PDD.

Based on the site visit and review of the documentation, both companies SFK and KERI are reputable companies, well established for several of their business lines and have the corresponding approvals for performing their respective business /13/ /14/ /41/ /43/ /44/. DNV

is of the opinion that all of the alternatives above (which are available to the project participants) are compliant with existing laws and regulations regarding SF_6 handling in South Korea.

The approved baseline methodology has been correctly applied to identify a complete list of realistic and credible baseline scenarios, and the identified baseline scenario most reasonably represents what would occur in the absence of the proposed CDM project activity.

All the assumption and data used by the project participants are listed in the PDD and/or supporting documents. All documentation relevant for establishing the baseline scenario is correctly quoted and interpreted in the PDD. Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD

4.5.3 Investment analysis

Choice of approach

Given that the alternative 3 above (capture and reclamation of used SF_6 gas without CDM revenues) to the continuation of the current practice (alternative 1 above) faces economic barriers, and in accordance with the "Combined tool to identify the baseline scenario and demonstrate additionality" /4/, an investment comparison analysis is used to compare the two alternatives. Since neither of such alternatives above have any revenues, the financial indicator used for assessing each alternative is the Net Present Value (NPV) of the project cash flows.

Benchmark selection

With regards to the benchmark chosen for the proposed project activity, according to the EB Guidelines on the Assessment of Investment Analysis /51/, Guidance 14 states: "Internal company benchmarks/expected returns (including those used as the expected return on equity in the calculation of a weighted average cost of capital - WACC), should only be applied in cases where there is only one possible project developer and should be demonstrated to have been used for similar projects with similar risks, developed by the same company or, if the company is brand new, would have been used for similar projects in the same sector in the country/region. This shall require as a minimum clear evidence of the resolution by the company's Board and/or shareholders and will require the validating DOE to undertake a thorough assessment of the financial statements of the project developer - including the proposed WACC - to assess the past financial behaviour of the entity during at least the last 3 years in relation to similar projects.". As stated in the rationale of Guidance 13 of the "Combined tool to identify the baseline scenario and demonstrate additionality", version 02.2 /4/: "Paragraph 4 of the Tool for the demonstration and assessment of additionality (version 3) requires that benchmarks should not include the subjective profitability expectations or risk profile of a particular project developer.", the additionality of the project activity shall not be dependent on the risk profile of the project developer for that project activity in isolation.

In the case of the proposed project activity, since all the investments of SFK are subject to the approval by the parent company, Solvay S.A., DNV finds it relevant and appropriate to apply a benchmark relative the same parent company (Solvay S.A.). In addition and further to the above analysis of the benchmark selection, the PP has presented further evidence about

another project undertaken by SFK in 2008 named "F1EC" /67/. DNV has been able to review and confirm the evidence submitted /67/, and verify that the discount rate used for the project named "F1EC", also developed by the project developer, is 9%, which is close to the 9.26% used as benchmark for the proposed CDM project activity.

However, it can be seen from the financial analysis /39/ that the estimated revenues based on the savings for the reclamation of the used SF_6 gas for the proposed project activity (USD 25 7549 USD/yr) are approximate 50% lower compared with the annual costs of the same (50 876 USD/yr). Thus, without the potential CDM revenues that the project could also derive, there are no other revenues linked to the project activity that could help to fully compensate/offset the project's costs to make it financially attractive. Upon this situation, even if a very conservative benchmark is used, such as the 5.5% rate for government bonds (Yields on 3-year Treasury bonds (LHS), "7-30 BoK Financial Stability Report Oct-2007.pdf" /50/, pp 12), the project activity will not be commercially attractive without the CDM revenues.

Thus it is DNV's opinion that the benchmark analysis made for the proposed project activity is appropriate.

Input parameters

The main parameters used in the investment analysis are as follows:

Parameter number and description	Value	Units	Source and evidences reviewed by DNV
Amount of used SF_6 reclaimed	9 713	kg	Historical records (baseline reconstruction) /15/ and baseline emission calculations /35/
Assumed percentage of SF_6 in contaminated gas (by mass)	99.77	%	Historical records (baseline reconstruction) /15/ and baseline emission calculations /35/
Depreciation (% p.a.)	20	%	National Standard /36/
Investment Cost SFK Site: - SF_6 Analyser - Piping - Filter KERI Site: - DILO Compressor - Piping - Price of 10 Cylinders	 0 52 828 10 834 53 629 21 253 38 140	USD	Offers/invoices from equipment suppliers /37/
Annual Operating Cost: - Labour (SFK) - Labour (KERI) - Laboratory	50 875 23 969 5 992 1 941	USD	Various estimations of internal costs /38/

- Transport - Chemicals for SF_6 Purification and additional operational costs for reprocessing used SF_6	8 667 2 165		
Savings on SF_6 raw materials at reclamation site	25 788	USD	Calculated value estimated via the baseline reconstruction and emission reductions calculations /35/, and the financial analysis of the project /39/
Discount rate	9.26	%	After-tax Weighed Average Cost of Capital (WACC) for Solvay SA at time of decision making /40/.

DNV has verified against the purchase invoices, and the internal costs and other reports, the corresponding values for each and all the parameters in the above table, and found them genuine, conservative and specific for the proposed project activity.

Calculation and conclusion

The main barrier faced by alternative 3 is the lack of financial attractiveness. Hence, an investment analysis /39/ is used rather than a barrier analysis, in correspondence with the "Combined tool to identify the baseline scenario and demonstrate additionality" /4/. From the result of the investment analysis calculations /39/ it can be seen that the NPV for the chosen project scenarios is as follows:

	Alt. 1 Baseline (venting)	Alt. 3 Project Activity (with CDM)	Alt. 3 Project Activity (without CDM)
NPV (USD)	0	7 476 622	(320 803)

Discount rate used: 9.26% After-tax Weighed Average Cost of Capital (WACC) for Solvay SA at time of decision-making. Evidence was provided to demonstrate that this discount rate was consistently applied by Solvay at the time of investment decision for the project.

The evidences and references provided for each of the input parameters the investment analysis were validated /15/ /35/ /36/ /37/ /38/ /40/ /45/and crosschecked against the values presented in the investment analysis itself /39/. Based on the above, DNV's opinion is that the underlying assumptions of the finanacial analyis are appropriate and the financial calculations are correct.

Sensitivity analysis

The objective of the sensitivity analysis is to assess whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions. Key financial parameters have been changed to see their impact on the NPV of the project, i.e.

alternative 3 (the NPV of alternative 1 remains at zero whatever the assumptions). The table below shows the percentage by which each of these variables would have to increase or decrease for the NPV to become positive (i.e. above that of alternative 1).

The PP SFK was able to present to DNV the market prices in Korea for SF_6 /45/ /57/ /71/, and a sample of some invoices issued during 2007, 2008 and 2010 /59/, which show some variations (including currency fluctuations) during the observation period 6.5-10.5 USD/kg between 2005-2007.

Results of the sensitivity analysis:

Scenario	% Change	NPV of alternative 3 (project activity) (USD)
Increase in Project Revenue (i.e. Recovered Used SF_6)	155.46%	0.00
Reduction in Investment Costs (i.e. DILO Compressor)	-184.83%	0.00
Decrease in Operating Costs (i.e. Labour Costs in SFK)	-93.81% -	0.00

In DNV's opinion the project participant has sufficiently demonstrated that these variations are not realistic for the input parameters of the financial analysis.

Project revenue: Project revenues come from the savings on raw materials (sulphur and AHF) and energy (electricity and steam), achieved by injecting used SF_6 rather than producing it from raw materials. The project activity does not result in an increase in production capacity at Solvay plant and hence there is no revenue from additional SF_6 production. Solvay is currently not operating at full capacity because of low demand of SF_6. DNV has verified through the "2009 SF_6 Production Report" /70/, that there has been no increase in SF_6 production, since the SF_6 production was only 964.9 tonnes, much less than the design production capacity of 1 500 tonnes. Project revenues are therefore dependent on:

- The savings realised per tonne of used SF_6 injected. These are not likely to increase because this savings is dependent on the price of raw materials to produce SF_6 which is also dependent on the price of SF_6 in the market. The average prices of SF_6 have remained within the same range from 2007 to 2009 (9.5-10.5 USD) /59/ which means that the price of raw material (i.e. AHF and S) will also remain at a certain range, thus, increasing the project revenue to 388% in order to raise the financial attractiveness of the project activity above the benchmark value 9.26% /40/,is unlikely.
- The amount of used SF_6 injected. Increasing the volume of used SF_6 is not likely to happen because it is dependent on how much gas is used for the testing of GIEEs at KERI. This is currently estimated at 9.7 tonnes per year only based on the recovery records for the period July 2008 to March 2009, which represent less than 5% of the total production capacity of the reclamation facility (1 500 tonnes per year /65/), which is the cap set by the applicability criteria of the approved methodology /3/. More used SF_6 could be recovered if more equipment was tested at KERI but there is no indication of such link as modern GIEEs tend to use less SF_6 to comply with the demands of end users.

Investment costs: Investment costs of the project comprise of the equipments and piping installed both at the testing facility and the reclamation facility. A decrease of 195.65% in investment costs is very unlikely to happen, as the scenario used is very conservative (e.g. it has been assumed that equipments/piping will be retained for the project lifetime while it is expected that some equipment will have to be replaced because of potential corrosive impacts of SF_6).

Operating costs: Operating costs of the project comprise of labour costs in KERI and SFK, laboratory analysis of used SF_6, transport of used SF_6 from KERI to SFK, chemicals needed for the purification of used SF_6, additional operational costs for reprocessing used SF_6 and insurance. The result of the sensitivity analysis means that even if the project reduces operating costs to zero, the NPV of the project remains negative. This is not feasible given the maintenance regime required on the equipments and qualified personnel required to ensure the adequate operations involved in the recovery and reclamation of used SF_6 in the project.

This sensitivity analysis clearly shows that the NPV of alternative 3 (project activity) remains negative, i.e. lower than that of alternative 1 (continued venting), for any realistic variation of the key variables. Therefore alternative 1 is identified as the baseline scenario due to its higher economic attractiveness.

4.5.4 Barrier analysis

The PP chose to present the investment analysis to demonstrate the project's additionality, therefore the barrier analysis is not included.

4.5.5 Common practice analysis

KERI is the only third party independent High Power High Voltage Testing Facility in Korea that is using and prevents venting of SF_6 gas, as confirmed by KOLAS (Korea Laboratory Accreditation Scheme) /66/ /72/. There is only one facility in Korea that manufactures SF_6 gases /45/ and only one facility that is planning to introduce a reclamation process (in both cases, the project developer is SFK). The proposed project activity is the first SF_6 reclamation activity in Korea.

During the site visit investigation mission, DNV was informed that the common practice was that, after the completion of the high voltage electrical tests executed at KERIs facilities on the GIEE and GIS equipment, it was the owner of such electrical equipment tested that was responsible for venting the used SF_6 gas (and not KERI's personnel). The reason for this is that KERI's personnel is not familiar with the physical construction and maintenance procedures of the equipment, and therefore the owner of the equipment is the one connecting the corresponding hoses and equipment for the venting of the used SF_6 gas. In order to verify this common practice, DNV requested the project proponent to present 3 letters from different KERI customers' /16/ /17/ /18/ stating that the venting of the used SF_6 gas is the common practice. Furthermore, a marketing brochure from LS Industrial Systems Co. Ltd./52/ (KERI's customer) which has facilities also in Korea, presented by the project proponent, shows in the brochure only KERI's name as a supplier of such high voltage testing certification services.

Throughout the site visit, DNV became acquainted that the high voltage testing of GIEE and GIS equipment in Korea is carried out at KERI's facilities (only facilities in Korea for high- and ultra high voltage testing), and that the gas used in such testing is vented to the atmosphere by the equipment manufacturer after the test. Furthermore, the relevant

geographical area is defined as South Korea, Japan and Taiwan, since all the equipment tested at KERI in 2007 came from one of these locations. However, Japan is an Annex I country, and therefore it can't be considered as a comparebale environment and is not furhter included in this common practice analaysis. The other testing facilities in South Korea (Power Testing &Technology Institute) and Taiwan (Taiwan electric Research and Testing Center) are excluded from the list since they do not have (do not provide or are accredited for independent 3rd party testing) high power testing facilitites,

DNV can thus confirm that the common practice of the project activity is the venting of the used SF_6 gas after the test, due to contamination of the same by the electrical arcing experienced during the test(s).

4.6 Monitoring

The monitoring plan presented in the PDD /1/ is described in accordance with the approved consolidated baseline and monitoring methodology ACM0079 version 02 /3/. The monitoring plan specifies the parameters that are determined ex-ante, those that are monitored during the operation of the project and the procedures for the monitoring activity.

At each of the project sites, the SF_6 recovery site (KERI) and the SF_6 reclamation site (SFK), will designate an on-site CDM coordinator who will have the overall responsibility for the relevant monitoring of emissions reductions of the project activity according to the monitoring plan, including data quality checking for any anomalies.

The CDM coordinators will report monthly to their respective senior management. All other technical staff which is involved in the data collection process will have defined roles and responsibilities. Staff will be trained on CDM monitoring requirements. Records of trained CDM staff will be retained. The overall monitoring responsibility will be with the CDM coordinator of the SF_6 reclamation site (SFK).

The primary equipment used for the monitoring of CDM parameters project is the following:

(i) Weighing scale: Scales will be used for weighing the cylinders in a bundle both at the SF_6 recovery and reclamation sites. The scales will be appropriately calibrated.

(ii) Flow meter: Flow meters will be used to quantify the SF_6 both at the SF_6 recovery and reclamation sites. The flow meters will be appropriately calibrated.

(iii) Gas chromatograph: The SF_6 content of used gas in each bundle will be analyzed using gas chromatography. The equipment will be appropriately calibrated

Two cylinders filled with waste (used) SF_6 gas will be transported in one bundle to the reclamation site, with each bundle clearly identified and marked. Each bundle will be weighed both at the SF_6 recovery site (before departure) and at the SF_6 reclamation site (upon arrival). Upon arrival at the SF_6 reclamation site, the used gas within each bundle will be analysed, to determine the proportion of SF_6 gas and the proportion of impurities (contamination).

Finally, the data monitored for CDM purposes will be recorded once the two cylinders in a bundle is filled with SF_6 and filed electronically. All relevant data will be archived electronically, and backed up regularly as per the company's procedures. The stored data will be kept for the full crediting period, plus two years after the end of the crediting period or the

last issuance of CERs for this project activity (whichever occurs later). The CDM Coordinators will be responsible for checking the data quality and for managing the collection, storage and archiving of all data and records.

The personnel at the reclamation site are in DNV's opinion properly trained in the procedures for the project activities. Also the personnel at KERI's facilities have been informed of the requirements of the corresponding process of project activities. However further emphasis shall be placed by each of the companies to ensure that all personnel that could eventually participate on any activity related to this project receives thorough training, specially regarding those activities deemed as highly unfrequented to occur (e.g. incineration of highly contaminated gas). Also, KERI shall develop plans for how to address the fact that KERI's customers fill their own electrical equipment; there should be consideration for a trained person to perform (or assist) in the filling of the electrical equipment to be tested. Furthermore, each of the company's QA/QC and administrative manuals shall be updated with the corresponding aspects of the project activities. Compliance to this will be ensured via a Forward Action Request (FAR 6), which shall be verified during the verification mission.

The project monitoring plan is in compliance with the monitoring methodology AM0079 (version 02).

It is DNV's opinion, that the project participants are able to implement the monitoring plan.

4.6.1 Parameters determined ex-ante

Baseline emissions are capped based on the historic values of venting used SF_6 gas which is estimated ex-ante, based on the used gas vented during the tests (6 945.20 kg/yr, baseline reconstruction /15/ /35/) and the concentration of SF_6 expected in used gas in the historical period (99.77% /15/ /34/). The latter is to be updated each year according to the monitoring of concentration of SF_6 expected in used gas in the historical period. To determine these the most recent one year historical data was used, in this case calendar year 2007.

The approved methodology /3/ offers a choice of two methods to determine the used gas vented during the tests, one is via the "Records of used gas" (preferred option by the methodology), and the second is based on the "Reconstruction based on Manufacturer Specification/ Nameplate or estimated equipment capacity" as per Annex A of the methodology /3/. Given the absence of information required by the preferred method, the PP followed the latter, which is based on any of the following alternatives. As indicated in Annex A of the approved methodology /3/, in the determination of the amount of used gas vented during the tests the following options shall be pursued: a) use the manufacturer specification or nameplate, b) use the default capacities contained in Table B.1 and B.2 of Annex B of the methodology /3/, or, c) via a special procedure developed by the PP and approved by the EB (via request from deviation from the methodology). Depending on data availability, the PP has used the nameplate data, or, if not, the values presented in Annex B of the approved methodology AM0079 version 02 /3/. Based on 300 test records taken during 2007 /15/, the PP has been able to reconstruct the baseline as required in Annex A of the approved methodology AM0079 version 02 /3/.

Please refer to section 4.7 for further details on how DNV has verified the calculation of ex-ante determined parameters.

The table below summarizes the parameters determined ex-ante.

Parameter	Description
GWP_{SF6}	Global warming potential of SF_6, taken from the IPCC.
$w_{SF6,hist}$	Concentration of SF_6 in used gas in the baseline
$TI_{SF6,used,t}$	Used gas vented during eligible testing item *t* for the historical baseline year.
Decision flow chart for the destination of removed SF_6	A decision flow chart to determine instances where the used gas legitimately vented in the past.
k	Sub-index used for equipment categories
$NT_{BL,k}$	Average number of eligible testing items where venting occurred por equipment in the baseline, for category *k*
$L_{SF6,hist,j}$	Historical amount of SF_6 loss from point *j*.
j	Sub-index used for SF_6 emission points
$P_{SF6,hist}$	Production of SF_6 gas during the historical period.
$LE_{Trans,est}$	Estimated annual emissions resulting from the transport of the cylinders from the SF_6 recovery site to the site of reclamation.
$FC_{i,j,y}$	Quantity of fuel type *i* combusted in process *j* during the year *y*
NCV_{diesel}	Net Calorific Value of the diesel
EF_{diesel}	Diesel Emission Factor
$TDL_{j,y}$	Average technical transmission and distribution losses for providing electricity to source *j* year *y*
$EF_{elec,j,y}$	Emissions factor for electricity consumed
-	Rated capacity of the operating equipment used for project activity of the testing facilities at recovery site and reclamation site in year *y*

4.6.2 Parameters monitored ex-post

In addition to the parameters to be monitored as described below in this section, according to the applicability criteria of approved methodology AM0079 version 02 /3/, see (FAR 5), issuance request shall be done in a yearly basis to avoid gaming, and, that only those cylinders that complete the recovery-reclamation process within a given year, can be included in the calculation of emissions avoided in the same year. If a recovery cylinder has not completed the recovery-reclamation process within the crediting year, then it must be included in the next year.

Also in accordance with the applied methodology AM0079 version 02 /3/, the project participant will monitor the following parameters ex-post:

Parameter	Description
GWP_{SF6}	Global warming potential of SF_6, taken from the IPCC (shall be updated according to any future COP/MOP decisions).
$w_{SF6,hist,y}$	Concentration of SF_6 in used gas in the baseline, to be used as a substitute for $w_{SF6,hist}$ where the record of the concentration of SF_6 in the gas vented in the baseline is not available.

Parameter	Description
$Q_{SF6,k,j,y}$	Mass of SF_6 that is filled into equipment *j* of category *k* in year *y* at the SF_6 recovery site.
$MR_{Gas,i,y}$	Mass of used gas recovered into cylinder bundle *i* at the SF_6 recovery site in year *y*.
$NT_{PJ,k,y}$	Average number of total testing items where recovery was done per equipment in the project, for category *k*.
i	Sub-index used for each cylinder bundle that completed a recovery-reclamation cycle included in the estimation of emissions avoided for year *y*.
n	Number of cylinder bundles that completed a recovery-reclamation cycle in the year *y*. Only these cylinder bundles are eligible to be included in the estimation of emissions avoided for the year *y*.
$MS_{Gas,i,y}$	Mass of used gas stored in recovery cylinder bundle *i* in year *y*.
$w_{SF6,i}$	Concentration of used SF_6 gas in the cylinder bundle *i*.
$MI_{Gas,i,y}$	Mass of used gas from the cylinder bundle *i* injected into the production process for reclamation process in year *y*.
$P_{SF6,i,y}$	Production of SF_6 gas during the reclamation period of cylinder *i*, in year *y*.
$P_{SF6,y}$	Production of SF_6 gas during the reclamation year *y* (Determined from records from regular production monitoring at SF_6 gas reclamation site).
$L_{SF6,y,i,j}$	Amount of SF_6 loss from point *j* during the reclamation period of cylinder *i* in year *y*.
PE_{TFy}	Project emissions as a result of increased electricity consumption at the testing facility attributable to project activity in year *y*.
PE_{RFy}	Project emissions as a result of increased electricity consumption at the reclamation facility attributable to project activity in year *y*.
$EXC_{SF6,y}$	Quantity of used SF_6 gas which was being injected to the reclamation facility during exceptional events occurred in year *y*

Given that the leakage emissions resulting from the transport of the cylinders from the recovery site to the site of reclamation in year *y* ($LE_{Trans,y}$), are marginal (LE = 0.0004% < 0.1%), as demonstrated here below in the corresponding leakage calculations section, these will not be monitored by the PP in accordance to step 1 of the leakage section of the approved methodology AM0079 version 02 /3/.

These parameters would be measured as per the chosen methodology and the frequency of monitoring and proposed QA/QC procedures are according to the chosen methodology as well. All data will be archived for a period of two years following the end of the crediting period.

4.6.3 Management system and quality assurance

The PP has developed and implemented the corresponding management and quality system /53/ /54/ /55/ /56/for the project activity, and DNV was able to verify these during the site investigation mission. As part of the management and QA/QC system both sites have a CDM coordinator assigned responsible to check all the data collected. Furthermore, SFK has the overall coordination and QA/QC verification of the CDM project activity. The PP has developed procedures /53/ /54/ /55/to ensure consistent quality of all data collection,

recording, storage, reporting and possible monitoring data adjustments and uncertainties as well as emergencies. It is understood that ESL will perform a regular final check of the data and analyse the project performance, prior to any verification. Moreover, regular internal audits will be conducted to assure that the project is in compliance with operational and CDM requirements.

It is DNV's opinion that the management and QA/QC procedures for the project activity reflect good industry practice, and will contribute to ensure the good quality and accuracy of the CDM project activity data/information.

4.7 Estimation of GHG emissions

The emission reductions of the proposed project specified in the PDD /1/, are calculated in accordance with the process specified in the approved methodology AM0079 version 02 /3/, the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /5/, and the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" /6/.

It should be mentioned that the amount of emission reductions presented in the PDD version 01 /1/, was calculated based in the version 1 of the approved methodology /3/, while the amount of emission reductions presented here, are estimated based on the latest version of the approved methodology, version 2 /3/, hence the difference betwen the estimation of the emission reductions shown in the initial and final PDD versions.

Base on the above, the baseline emissions are determined as follows:

Step 1: Baseline venting of SF_6

SF_6 relative cap

Baseline emissions are capped relative to the historic venting of SF_6. SF_6 venting is estimated *ex-ante* using the methods described below to determine $V_{SF6,hist}$.

Sub-step 1(a): Determine VSF6,hist* (historical *annual venting of SF_6)

The estimated historical annual SF_6 venting ($V_{SF6,hist}$) of the SF_6 recovery site for one year historical data, which in the case of the project activity these correspond to the calendar year 2007 /15/. $V_{SF6,hist}$ is calculated as the sum of the used SF_6 gas vented for each testing item *t* in the historical year. $V_{SF6,hist}$ is to be calculated *ex-ante*; however, it is to be updated each year according to the monitoring of $w_{SF6,BL,y}$

$$V_{SF6,hist} = w_{SF6,hist} \sum_{t} TI_{SF6,used,t} \quad \text{..... (1)}$$

Where:

$V_{SF6,hist}$ = Historical annual venting of SF_6, in tonnes SF_6.
In the case of the project activity these have been calculated as:

	6 923.8 tSF_6/yr from the baseline reconstruction. This figure was verified by reviewing test records from 2007 /15/ and by reviewing the spreadsheet used to calculate the historical annual venting of SF_6 /35/.
$TI_{SF6,used,t}$ =	Used gas vented during eligible testing item *t*, tonnes gas (see Sub-step 1(b)), which for the project activity is: 6 945.2 tonnes of gas /15/ /35/.
wSF6,hist =	*Concentration of SF_6 expected in used gas in the historical period, tonnes SF_6 /tonnes gas.*

Sub-step 1(b): Determine $TI_{SF6,used,t}$ (Used gas vented during eligible testing items t)

Testing of equipment may be comprised of one or several testing items performed on different subparts of single equipment. Records, in the form of direct measurements or other indirect data to estimate SF_6 emissions are required for each testing item to be included in the historical baseline determined *ex ante*. Two different methods are described in this section to determine or estimate the used SF_6 gas vented, $TI_{SF6,used,t,}$ for each testing item *t*.

Method 1. Records of gas use (preferred)

If the SF_6 recovery site has historical records of SF_6 gas vented for the testing instance *t* in the form of measurements of SF_6 filled into the equipment prior to or used gas removed after the test that complies with the monitoring requirements stated in section "Data and Parameters not Monitored", then $TI_{SF6,used,t}$ is to be taken from the monitored data.

The measured/monitored data (used/contaminated SF_6 gas) are available from 2008 onwards /34/, therefore Method 1 can not be followed.

Method 2. Reconstruction based on Manufacturer Specification/Nameplate or estimated equipment capacity

If the SF_6 recovery site does not have monitored data of used gas vented for testing item *t*, then $TI_{SF6,BL,t}$ shall be reconstructed using the procedure described in Annex A. Note that, for the purpose of conducting Step 3 below, the procedure described in Annex A needs to be conducted even when the record of gas use is available.

The corresponding documents (records) that form the database for the project activity were made available to DNV for validation /15/, and these records were crosschecked against the summary table for baseline reconstruction /35/.

The records provided by the PP forth reconstruction of the baseline; include the following generic types of documents:

1. Application: This is the application issued by KERI's customer with the specification of what to test and to which standards, type of equipment, identification, name of manufacturer, etc., e.g. file name: *07C00192-7146-Application.pdf*
2. Nameplate: When available, this document includes a photograph of the nameplate of the equipment tested, indicating the amount of SF_6 required to fill the equipment (capacity), e.g. file name: *07C00192-7146-Nameplate.pdf*
3. No load: Technical information graphically represented (chart) of No-Load tests performed on the GIEE equipment (parameters: Cont, ContA, ContB and ContC are used to verify the number of phases connected to the equipment), e.g. file name: *07C00192-7146-No load.pdf*

4. Raw data: Document containing the (detail) raw data listing of the executed tests (for each testing item), e.g. file name: *07C00192-7146-Raw data.pdf*
5. Report: One (front) page certificate of the test(s) performed, e.g. file name: *07C00192-7146-Report.pdf*
6. Report_Extended: This includes the Report (above) and a full detailed description of the tests made, e.g. file name: *07C00192-7146-Report_Extended.pdf*

With regards to the specific project activity, each test is made out of one or more testing items. The Annex A of the approved methodology /3/ presents the procedure to reconstruct the baseline.

Whenever the data specifying the amount of gas required for the equipment in question (nameplate or other manufacturer specification) was not available, the tables B.1 and B.2 of Annex B of the approved methodology /3/, were used to determine the capacity of the SF_6 utilized in the equipment under testing. From a total of 56 equipments tested in 2007, 19 tests are calculated with the nameplate capacity and the rest with the default values.

Step 2: Annual SF_6 reclamation during the project activity

Next, the amount of SF_6 reclaimed as a result of the project activity shall be monitored annually. For this purpose, monitored data from project year *y* to determine SF_6 reclaimed in that year shall be used. Given the nature of the project activity, the unit used as a basis for calculation is the recovery reclamation cylinder *i*. Note that recovery-reclamation cylinder *i* refers to each 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. In some cases the same physical cylinder may be used for more than one recovery-reclamation cycle in the crediting period *y*. However, if a cylinder is reused, it will have to be clearly labelled in each recovery reclamation cycle.

It must be pointed out that with regards to the project activity, the project uses bundles of two interconnected gas cylinders as a 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”.

Only those cylinders that complete the recovery-reclamation process in year *y* can be included in the calculation of emissions avoided in year *y*. If a recovery cylinder has not completed the recovery reclamation process in the crediting year *y*, then it must be included in the year *y+1*.

The emissions avoided in year *y* from each cylinder *i*, $CA_{i,y}$ is determined *ex-post* based on the minimum among the following:

Where:

$MR_{Gas,i,y}$ =	Mass of used gas recovered into cylinder *i* at the SF_6 recovery site in year *y*
$MS_{Gas,i,y}$ =	Mass of used gas stored in recovery cylinder *i* in year *y*, tonnes gas
$MI_{Gas,i,y}$ =	Mass of used gas from cylinder *i* which is injected for reclamation process in year *y*, tonnes gas
i =	Sub-index used for each cylinder that completed a recovery-reclamation cycle included in the estimation of emissions avoided for the year *y*

Take the minimum of the three to determine the cylinder minimum for each cylinder *i*:

$$CA_{i,y} = MIN\{MR_{Gas,i,y}, MS_{Gas,i,y}, MI_{Gas,i,y}\} \quad \text{.....(2)}$$

Where:

$CA_{i,y}$ = Cylinder minimum for cylinder *i* in year *y*, tonnes gas

Determine the quantity of SF_6 reclaimed during the year *y*:

$$EA_y = \sum_i CA_{i,y} * w_{SF6,i} \quad \text{.....(3)}$$

Where:

EA_y = Quantity of SF_6 reclaimed during the year y, tonnes SF_6. This value is first determined based on the operating time of 8 months (see below) and then adjusted to a 12 months period (which is expected), for a value of 9 713.5 kg.

$w_{SF6,i}$ = Concentration of SF_6 in the cylinder i, tonnes SF_6 /tonnes gas. For the project activity this value is determined as an average of the 50% most contaminated bundles during the operation period (1 June 2008 – 20 January 2009, 8 months), giving a value of 99.6914%

Step 3: Establish the discount factor for number of testing

Thirdly, the cylinder minimum obtained as per Step 2 shall be discounted for any possible increase in the number of testing per equipment compared with the historic baseline period. In order to address this, the following steps shall be taken.

Sub-step 3(a)

Define the maximum number of equal range, in KV, categories that contain at least 5 equipments both of the historic and project samples. If less than 5 equipments are tested either in the historic or project period, then there shall be one category.

For the project activity, there are 56 equipments were tested in 2007 /15/ /35/. The capacity of these equipments ranges from 72 kV to 800 kV /15/ /35/ and organized in the following two categories, given that on this classification, gives the maximum number of categories for which each category contains at least 5 equipments.

	Historic	**Project**
40 – 419 kV	46	46
420 – 800 kV	10	10
Total number of tested equipment	56	56

For the ex-ante estimation, it is assumed that the number of testing items over a project year would be similar as the number of testing items under a baseline year.

Sub-step 3(b)
Derive the average number of *eligible* testing items where venting occurred per equipment in category *k* in the baseline ($NT_{BL,k}$), by using the database compiled when determining $TI_{SF6},used,t$.

For the project activity, based on the records collected /15/ /35/:

Category	***Eligible testing items where venting occurred***	***Average number of eligible testing items***
40 – 419 kV	127	2.76
420 – 800 kV	19	1.90

Sub-step 3(c)
Derive the average number of *total* testing items where recovery was done per equipment in the project in category *k* in the year *y*, ($NT_{PJ,k,y}$) by using the testing records from the project year.

For the project activity, based on the records collected /15/ /35/:

Category	***Total testing items where recovery was done***	***Average number of eligible testing items***
40 – 419 kV	168	3.65
420 – 800 kV	21	2.10

Sub-step 3(d)
Calculate the ratio of number of eligible testing items for each category *k* as follows:

$$RT_{k,y} = \frac{NT_{BL,k}}{NT_{PJ,k,y}} \quad \text{.....(4)}$$

Where:

$RT_{k,y}$ = Ratio of number of eligible testing items in category *k* (maximum value is set at 1)

$NT_{BL,k}$ = Average number of eligible testing items where venting occurred per equipment in the baseline, for category *k*

$NT_{PJ,k,y}$ = Average number of total testing items where recovery was done per equipment in the project, for category *k*

Again, for the project activity and based on the records collected 15/ /35/:

Category	$NT_{BL,k}$	$NT_{PJ,k,y}$	$RT_{k,y}$
40 – 419 kV	2.76	3.65	0.76
420 – 800 kV	1.90	2.10	0.90

Obtain discount factor for testing, DFT_y:

$$DFT_y = \frac{\sum_k (Q_{SF6,k,y} * RT_{k,y})}{Q_{SF6,y}} \quad \text{.....(5)}$$

$$Q_{SF6,k,y} = \sum_j Q_{SF6,k,j,y} \quad \text{.....(5.1)}$$

$$Q_{SF6,y} = \sum_k Q_{SF6,k,y} \quad \text{.....(5.2)}$$

Where:

DFT_y = Discount factor for testing in year y

$Q_{SF6,k,y}$ = Total amount of SF_6 filled in the testing of equipments in category k in year y, tonnes SF_6. Since the monitoring of the filling of the equipment has not yet started to the time of validation, this value is assumed to be equal to the value of the SF_6 captured at the recovery site, namely 9 713.5 kg of SF_6 /15/ /35/.

$Q_{SF6,y}$ = Total amount of SF_6 filled in testing of all equipments in the project activity in year y, tonnes SF_6. For hte project activity this valueis equivalent to: 9 713.5 kg of SF_6 15/ /35/.

$RT_{k,y}$ = Ratio of number of eligible testing items in category k (maximum value is set at 1)

$Q_{SF6,k,j,y}$ = Amount of SF_6 that is filled into equipment j of category k in year y at the SF_6 recovery site, tonnes SF_6

For the 2 categories of the project activity, the values are then (based on the records 15/ /35/):

$Q_{SF6,40\text{-}419,y}$ = 4 856.8 kg of SF_6

$Q_{SF6,420\text{-}800,y}$ = 4 856.8 kg of SF_6

And the discount factor for the project activity is then:

	$Q_{SF6,k,y}$ (t SF_6)	$RT_{k,y}$ (ratio)	$Q_{SF6,k,y} * RT_{k,y}$	Sum	DFTy
40-419 kV	4.857	0.756	3.671	8.066	0.830
420-800 kV	4.857	0.905	4.394		

Step 4: Calculate the baseline emissions

Calculate baseline emissions as the minimum between the quantity of SF_6 reclaimed during the year, discounted for number of testing, and the best estimate of historical annual emissions $V_{SF6,hist}$, determined in Step 1.

$$BE_y = MIN\{V_{SF6,hist}, DFT_y * EA_y\} * GWP_{SF6} \quad \text{.....(6)}$$

Where:

BE_y = Baseline emissions year y, tCO_2e

DFT_y = Discount factor for testing in year y

EA_y = Quantity of SF_6 reclaimed during the year y, tonnes SF_6

$V_{SF6,hist}$ = Historical annual baseline venting of SF_6, tonnes SF_6

GWP_{SF6} = Global warming potential of SF_6, tCO_2e/tonnes SF_6

Parameter	Value	Unit
DFTy	0.830	-
EAy	9.714	tonnes of SF_6
VSF6,hist	6.924	tonnes of SF_6
GWPSF6	23,900	tonnes of CO_2
BEy	**165,478**	**tonnes of tCO_2e**

Project emissions

Project emissions include used SF_6 emitted during reclamation and any exceptional emissions at the SF_6 reclamation site.

Step 1: Used SF6 emitted during reclamation

Project participants shall identify all plausible point in the production line of SF_6, after the point of injection of used SF_6, where SF_6 gas is emitted (for example, a purge gas outlet), and provide the historical SF_6 loss rate per unit SF_6 produced from that point j based on a 3-year historical average data of the SF_6 production facility. Where 3 year data does not exist, shorter periods can be used, up to the point where data is available, as follows.

$$R_{SF6,hist,j} = \frac{L_{SF6,hist,j}}{P_{SF6,hist}} \quad \text{.....(7)}$$

Where:

$R_{SF6,hist,j}$ = Historical rate of SF_6 loss from point j, %, 0.058%

$L_{SF6,hist,j}$ = Historical amount of SF_6 loss from point *j*, tonnes, SF_6 434 kg SF_6/15/ /35/
$P_{SF6,hist}$ = Production of SF_6 during the historical period, tonnes, SF_6 748 608 kg SF_6/15/ /35/
j = Sub-index used for SF_6 emission points

The SF_6 emissions through the point(s) *j* should be monitored during the project activity, and the corresponding rate of loss per unit SF_6produced, $R_{SF6,y,j}$, should be determined.
$R_{SF6,y,j}$, and $R_{SF6,hist,j}$ must both be determined under the same measurement protocol, which must be in place.

$$R_{SF6,y,j} = \sum_i \frac{L_{SF6,y,j,i}}{P_{SF6,y,j}} \quad \text{.....(8)}$$

Where:
$R_{SF6,y,j}$ = Rate of SF_6 loss from point *j* in year *y*, %
$L_{SF6,y,j,i}$ = Amount of SF_6loss from point *j* during the reclamation period of cylinder *i* in year *y*, tonnes SF_6
$P_{SF6,y,i}$ = Production of SF_6 during the reclamation period of cylinder *i*, in year *y*, tonnes SF_6
j = Sub-index used for SF_6 emission points

At the end of each year of the project activity, compare the $R_{SF6,y,j}$ with the $R_{SF6,hist,j}$. If $R_{SF6,y,j}$ is larger than $R_{SF6,hist,j}$, project emissions from the emission of SF_6 during reclamation in the year *y* shall be calculated by the following equation:

$$PE_{RCL,y} = GWP_{SF6} * \sum_{j,i} \left(R_{SF6,y,j,i} - R_{SF6,hist,j} \right) * P_{SF6,y,i} \quad \text{.....(9)}$$

Where
$PE_{RCL,y}$ = Project emissions from the emission of SF_6 during reclamation in the year *y*, t CO_2e
GWP_{SF6} = Global warming potential of SF_6, t CO_2e/t SF_6, equal to 23 900 tCO_2e /21/
$R_{SF6,y,j,i}$ = Rate of SF_6 loss from point *j* during the reclamation period of cylinder *i*, in year *y*, %. For the project activity this values is: 0.058% /15/ /35/
$R_{SF6,hist,j}$ = Historical rate of SF_6 loss from point *j*, %. For the project activity this values is: 0.067% /15/ /35/
$P_{SF6,y,i}$ = Production of SF_6during reclamation period of cylinder *i* in year *y*, t SF_6

Thus for the calculation of $PE_{RCL,y}$, we then have (based on /15/ /35/):

i	$L_{SF6\ y,j,i}$ (kg)	$P_{SF6\ y,j,i}$ (tonnes)	$R_{SF6\ y,j,i}$ (%)	$\sum(R_{SF6\ y,j,i} - R_{SF6,hist,j}) * P_{SF6,y,i}$
	From Site Records /15/ /35/	From Site Records /15/ /35/	Calculated value	Calculated value
1	11.944	25.0	0.048	-0.0025
2	14.834	33.8	0.044	-0.0047
3	14.110	32.1	0.044	-0.0045
4	37.208	20.9	0.178	0.0251
5	15.994	21.3	0.075	0.0037
6	10.685	21.0	0.051	-0.0015
7	16.328	27.4	0.060	0.0004
∑	*121.103*	*181.36*	*0.0668*	***0.0160***

Since, $R_{SF6,y,j} > R_{SF6,hist,j}$, then,

$PE_{RCL,y} =$ 23 900 * 0.0160 = 382 tCO_2e

Step 2: Electricity use of recovery equipment

Emissions as a result of electricity consumption at the testing facility ($PE_{TF,y}$) and reclamation facility ($PE_{RF,y}$) due to the use of recovery equipment shall be taken into account, according to "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /5/. Since emissions due to electricity consumption of these facilities are assumed to be small, electricity consumption has been approximated by the rated capacity of the operating equipment multiplied by operating hours of the facility. .

From the Tool /5/, the scenario A is the one applicable to the project activity, namely, electricity consumption from the grid.

$$PE_{EC,y} = \sum_j EC_{PJ,j,y} * EF_{EL,j,y} * (1 + TDL_{j,y})$$

Where :

$PE_{EC,y}$ = Placeholder for $PE_{TF,y}$ and $PE_{RF,y}$

$PE_{TF,y}$ = Project emissions as a result of increased electricity consumption at the testing facility attributable to project activity in year y

$PE_{RF,y}$ = Project emissions as a result of increased electricity consumption at the reclamation facility attributable to project activity in year y

$EC_{PJ,j,y}$ = Quantity of electricity consumed by the project electricity consumption source j in year y (MWh/yr)

$EF_{EL,j,y}$ = Emission factor for electricity generation for source j in year y (tCO_2/MWh)

$TDL_{j,y}$ = Average technical transmission and distribution losses for providing electricity to source j in year y

j = Sources of electricity consumption in the project, j = TF, RF

Regarding the value for $EF_{EL,j,y}$, option A2 was selected and assigned a conservative value of 1.3 tCO_2e/MWh, given that scenario A applies only to project electricity consumption sources and not to baseline electricity consumption sources.

Regarding the project emissions at the reclamation site, $PE_{RF,y,}$

KERI's testing facility	**Two Compressors**	**Suctioning Pump**	**Vacuum Pump**	**Evaporator**	**Total**
Value	10 kW	0.6 kW	1.5 kW	4.8 kW	16.9 kW
Source	Site records /15/ /35/				Calculated

The density of the recovered gas is:

$$D_{rec} = w_{SF6,hist} * D_{SF6} + (1-w_{SF6,hist}) * D_{air}$$

Where:

$D_{recov\ gas}$= Density of recovered gas, kg/m3

$w_{SF6,hist}$= Concentration of SF_6 expected in used gas in the historical period, tSF_6/tgas

D_{air}= Density of air, kg/m3

D_{SF6}= Density of SF_6, kg/m3

Parameter	**Value**	**Unit**	**Source**
wSF6,hist	0.9969	tSF6/tGas	Average concentration of SF_6 from the 50% most contaminated gas sample, /15/ /35/
D air	1.292	kg/m3	Standard Value - Link 'http://en.wikipedia.org/wiki/Density_of_air'
D SF6	6.164	kg/m3	Standard Value - Link 'http://en.wikipedia.org/wiki/Sulfur_hexafluoride'
D recov. gas	**6.149**	kg/m3	Calculated

The compressor's compression rate as per purchase order /31/, 11.4 m^3/hr, and the expected amount of gas requiring compression (EAy from equation 3 above) is: 9 713.5 kg/yr.

Thus the operating hours of the equipment is estimated to be $EAy/D_{recov\ gas}$/Compression, equal to 139 hr. This multiplied by the power (16.9 kW) gives a total consumption of 2 349.1 kWh for the recovery site.
The product of these variables will then give a total of 3.6 tCO_2e.

Thus for the project activity /15/ /35/:

Parameter	**Value**	**Unit**	**Source**
$EC_{PJ,j,y}$	2.33	MWh	Approximated as rated capacity of equipment times operating hours as per AM0079 v 2
$EF_{EL,j,y}$	1.3	tCO_2/MWh	Tool to calculate baseline, project and/or leakage emissions from electricity consumption

$TDL_{j,y}$	0.20	-	Tool to calculate baseline, project and/or leakage emissions from electricity consumption
$PE_{TF,y}$	**3.6**	**tCO_2e**	Calculated

In a similar fashion for the reclamation site, based on the references provided /15/ /35/:

The rated capacity of equipment is 0.006 kW /15/ /35/, and the operating hours are considered as 8 760 hr (conservative estimate), and the project emission for ht reclamation site are then:

Parameter	**Value**	**Unit**
$EC_{PJ,j,y}$	0.05	MWh
$EF_{EL,j,y}$	1.3	tCO_2/MWh
$TDL_{j,y}$	0.20	-
$PE_{RF,y}$	**0.0820**	**tCO_2e**

Step 3: Exceptional Project Emissions

It is unlikely but not impossible that an exceptional event at the SF_6 reclamation site, for example an accident or emergency plant shutdown, could lead to the emission of SF_6 injected for reclamation. The project proponent must record the date and time of any such exceptional event that occurs in year *y* that results in the exceptional emission of SF_6. The SF_6 quantity ($EXC_{SF6,y}$) from any reclamation that coincides with the event must be considered as project emissions ($PE_{EXC,y}$). For example, if a recovery cylinder of used gas was being reclaimed when the event occurred, then the amount of gas extracted from the cylinder between 5 hours prior to the exceptional event and the time that the injection line was closed must be considered as $EXC_{SF6,y}$.

$$PE_{EXC,y} = GWP_{SF6} * EXC_{SF6,y} \quad \text{.....(10)}$$

Where

$PE_{EXC,y}$ = Project emissions from exceptional event(s) at the SF_6reclamation site in year *y*, t CO_2e

GWP_{SF6} = Global warming potential of SF_6, t CO_2e/t SF_6

$EXC_{SF6,y}$ = Quantity of SF_6which was being injected to the reclamation facility during exceptional events occurred in year *y*, tonnes SF_6

The project exceptional emissions are:

Parameter	**Value**	**Unit**	**Source**
GWP_{SF6}	23,900	t CO_2e/t SF_6	IPCC /21/
$EXC_{SF6,y}$	0	t SF_6	Site records /15/ /35/
$PE_{EXC,y}$	**0.00**	**t CO_2e**	**Calculated**

Step 4: Total Project Emissions

The project emissions in year *y* are the sum of the two potential sources.

$$PE_y = PE_{RCL,y} + PE_{TF,y} + PE_{RF,y} + PE_{EXC,y} \quad \text{.....(11)}$$

Where:

PE_y = Project emissions in year *y*, t CO_2e

$PE_{RCL,y}$ = Project emissions from emission of SF_6 during reclamation in year *y*, t CO_2e

$PE_{TF,y}$ = Project emissions as a result of increased electricity consumption at the testing facility attributable to project activity in year *y*, t CO_2e (See monitoring section)

$PE_{RF,y}$ = Project emissions as a result of increased electricity consumption at the reclamation facility attributable to project activity in year *y*, t CO_2e (See monitoring section)

$PE_{EXC,y}$ = Project emissions from exceptional event(s) at the SF_6 reclamation site in year *y*, t CO_2e

And the project emissions are then:

Parameter	Value	Unit	Source
$PE_{RCL,y}$	382	tCO_2e	Calculated in Step 1
$PE_{TF,y}$	3.6	tCO_2e	Calculated in Step 2a
$PE_{RF,y}$	0.08	tCO_2e	Calculated in Step 2b
$PE_{EXC,y}$	0	tCO_2e	Calculated in Step 3
PE_y	**386**	**tCO_2e**	**Calculated**

Leakage

Leakage emissions attributable to the project activity could result from the transportation of the cylinders from the SF_6 recovery site to the SF_6 reclamation site ($LE_{trans,y}$);

$$\frac{(LE_{Trans,est})}{BE_y - PE_y} \leq 0.1\% \quad \text{.....(12)}$$

$LE_{Trans,est}$ = Estimated annual emissions from transport of the cylinders from the SF_6 recovery site to the SF_6 reclamation site, tCO_2e (See monitoring section)

Then the leakage emissions associated with the project are deemed to be negligible compared to the range of uncertainty of the GWP estimate, and they can be ignored during the crediting period ($LE_y = 0$).

In the case that the estimated leakage emissions do not fulfil the above condition, use the following to calculate LE_y each year:

$$LE_y = LE_{Trans,y} \quad \text{.....(13)}$$

For the calculation of the leakeage emissions the following data are considered:
Fuel type (i): Diesel /22/

- Diesel's NCV as per default values IPCC 2006: 43.00 GJ/t_{DIESEL} /21/
- $EF_{CO2,DiIESEL}$ as per default values IPCC 2006: 0.0741 tCO_2e/GJ /21/

Based on the above the calculated value for the project's $COEF_{DIESEL}$ parameter is:

$$3.19\ tCO_2e/t_{DIESEL}$$

The consumption of diesel for transportation of the bundles during one year (fuel consumption, $FC_{i,j,y}$), is calculated as follows:

- Bundle transportation vehicle's fuel consumption: 0.1 l/km /22/
- Diesel density: 0.85 kg/l /23/
- Round trips per year between recovery and reclamation sites: 11
- Distance between the recovery and reclamation site (round trip): 208 km (GPS determined).

Thus,

$FC_{DIESEL,y}$= 0.1 l/km * 0.85 kg/l * 11 round trips * 208 km / round trip
= 194.5 kg_{DIESEL}/yr
= 0.19 t_{DIESEL}/yr

Similarly, the leakage emissions are then:

$LE_{FC,j,y}$ = 3.19 tCO_2e/t_{DIESEL} * 0.19 t_{DIESEL}/yr
= 0,61 tCO_2e/yr

Considering that the magnitudes of the baseline and project emissions are 165 478 and 386 tCO_2e/yr respectively, it can be seen that the leakage emissions associated with the proposed project activity are comparatively negligible. Furthermore, they are also very marginal compared to the range of uncertainty of the GWP estimate, and thus can be ignored during the crediting period (LE = 0.0004% < 0.1%).

Emission reductions
The emission reductions in each year of the project activity are the baseline emissions minus any project emissions and leakage emissions.

$$ER_y = BE_y - PE_y - LE_y$$

Where:
ER_y = Emission reductions due to the project activity in year *y*, tCO_2e

BE_y = Baseline emissions year *y*, tCO_2e
PE_y = Project emissions in year *y*, tCO_2e
LE_y = Leakage emissions in year *y*, tCO_2e

Which for the proposed project activity, the project emission reduction per year are:

ERy = 165 478 tCO_2e/yr - 386 tCO_2e/yr – 0

ERy = 165 092 tCO_2e/yr

Based on the calculations and results presented in the sections above the implementation of the project activity will result in an average ex-ante estimation of emission reduction conservatively calculated to be 165 092 tCO2e per year for the selected crediting period. All assumptions and data used by the project participants are listed in the PDD and/or supporting documents, including their references and sources. All documentation used by the project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD. All values used in the PDD are considered reasonable in the context of the proposed CDM project activity. The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions. All estimates of the baseline, project and leakage emissions can be replicated using the data and parameter values referred to in the PDD.

4.8 Environmental impacts

With the exception of the transportation of the cylinder bundles between the sites of the project, the project is confined to the spatial boundaries of the companies established on each of the sites, namely SFK and KERI. Each of them has all the necessary permits required by the Host Country regulations (Permit for emissions of Air Pollutants, Permit for non-point waste water Pollutants, and Permit for toxic chemical usage, manufacture and sale) to perform their main activities. Since the project activities are only a minor variation to their main activities respectively, the former are therefore also covered within the environmental, legal, operational, and business permits held by each of the companies.

4.9 Comments by local stakeholders

DNV has revised and found sufficient and authentic the evidence presented regarding the initiatives taken to invite the relevant stakeholders to make comments about the project. The stakeholders addressed were the local and central government officials, SF_6 client companies, neighbouring chemical companies local environment NGO, and finally public in general via public announcement in local news paper and the PP's and UNFCCC's websites. Furthermore as the evidence show, the PP recorded the responses received, none of which present any major or important concern for the project activities. Thus, DNV is of the opinion that the PP has taken the necessary steps to inform the relevant stakeholders about the project activities, collect their responses regarding these activities and take the necessary actions to address the responses accordingly.

These initiatives taken by the PP and the response received are as follows:

1. Public announcement in a local newspaper – 'Kyungsang Daily' Newspaper of April 15th, 2009.
   Through the newspaper announcement, two people whose names were not in the invitee list came to attend the stakeholder event. No on-line comments were received.
2. Public announcement on KERI's website26 – from April 22nd, 2009.
   No comments were received.
3. Media coverage in an internet newspaper27 – 'ETNews' of April 20th, 2009.
   No comments were received.
4. Meetings with the DNA of Korea and CDM division of Ministry of Environment (ME) and Ministry of Knowledge Economy (MKE) on April 22-23, 2009.
   The DNA officers showed high interests in the project, as the first SF_6 project in Korea with a new methodology. They were especially impressed in the concept of "reuse system (i.e., recycle and reclamation)" instead of "incineration", and asked if the technology could be applied and extended to other industrial sectors (other plant systems). SFK answered all the technical questions to them and received very positive feedbacks and words of supports for the project from them. The actual times of visit and attendants are as follows:
   - DNA of Korea (April 22nd, 2009): Mr. Ho-seung Sung, Deputy Director, at K-DNA of Prime Minister's Office.
   - ME (April 23rd, 2009): Mr. Ms. Hyein Heo, Deputy Director of Climate & Air Quality Policy Division.
   - MKE (April 23rd, 2009): Mr. Han-koo Yeo, Director of Climate Change Policy
5. A local stakeholder event held on April 30th, 2009 in Ulsan.
   See below.
6. The global consultation through the posting of the PDD in the UNFCCC website from 04 Jun 09 - 03 Jul 09.
   No comments were received.
7. Staff interviews held during the site visit.
   The persons interviewed and the topics discussed are presented in the section 3.2 of this report (Follow-up interviews with stakeholders).

Finally, regarding the local stakeholder consultation, the event was organized and conducted by SFK, KERI and EcoSecurities. The purpose of the event was to share with those affected by the project, information about the project proposal, and to offer an opportunity to ask questions to further their understanding. Therefore, a range of stakeholders with a potential material interest in the development of the project were included in the invitee list including local and central government officials, SF_6 client companies, neighbouring chemical companies and local environment NGO. The invitation was carried out via the electronic mail of each invitee. A list of the invitee and the attendees was presented by the PP "3_1 SF6 Korea Stakeholder report_(LL_NS)_14.05.09" /45/. The responses (comments and questions raised) were recorded by the PP during the meeting. From the responses received it can be seen that the project is perceived as positive. None of the comments received were directed towards the design of project or its execution, but these rather were of a informative nature, or not specific to the proposed CDM project activity. Therefore, no changes were made to the initial project planning/design.

4.10 Comments by Parties, stakeholders and NGOs

The PDD, version 01 dated 22 May 2009, was made publicly available on the CDM website and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 4 June 2009 to 3 July 2009.

No comments were received.

http://cdm.unfccc.int/Projects/Validation/DB/G5VFCVZVDLRP35W6A9JMKNN0HPLXOH/view.html

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APPENDIX A

CDM VALIDATION PROTOCOL

Table 1 Mandatory requirements for Clean Development Mechanism (CDM) project activities

Requirement	Reference	Conclusion
About Parties		
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.	Kyoto Protocol Art.12.2	~~CAR 1~~ OK
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	~~CAR 1~~ OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	~~CAR 1~~ OK
4. The project shall assist Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	~~CAR 1~~ OK
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	OK
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	OK
About additionality		
10. Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	OK

Ref: References (see also references mentioned in column "Assessment by DNV"; MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Requirement	Reference	Conclusion
that would have occurred in the absence of the registered CDM project activity.		
About forecast emission reductions and environmental impacts		
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	OK
For large-scale projects only		
12. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK
About stakeholder involvement		
13. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	OK
14. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK
Other		
15. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
16. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	OK
17. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
18. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK

Table 2 Requirements checklist

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
A General description of project activity						
A.1	**Title of the project activity (VVM para 55-57)**					
A.1.1	Does section A.1 of the PDD include a clearly identifiable project title, version number of the PDD and date of the PDD?	/1/	DR	☒ Clearly identifiable title of the project activity ☒ Version number of the PDD is included ☒ Date of the PDD is included.	~~CAR 21~~ ~~CAR22~~	OK
A.1.2	Is the PDD is in accordance with the applicable requirements for completing PDDs?	/1/	DR	☒ Yes, the PDD complies with the relevant forms and guidance for completing the PDD. *If no, list where the PDD is not in accordance:* *See listing under CAR21, CAR22, & CL1*	~~CAR 21~~ ~~CAR22~~ ~~CL1~~	OK
A.2	**Description of the project activity (VVM para 58-64)**					
A.2.1	How was the design of the project assessed?	/1/	DR	*What type is the project?* ☒ Project in existing facility or utilizing existing equipment(s) ☒ Project is either a large scale project or a small scale project with emission reductions exceeding 15 000 tCO_2e per year. In this case, a site visit must be performed. ☐ Project is a bundled small scale project, with each project in the bundle with emission reductions not exceeding 15,000 tCO_2e per year. In such case the number of physical site visits may be based on sampling, if the sampling size is		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				appropriately justified through statistical analysis. ☐ The project is an individual small scale project activity with emission reductions not exceeding 15 000 tCO_2e per year. In this case, DOE may not conduct a physical site visit as appropriate. ☐ Greenfield project *How was the design of the project assessed?* ☒ Physical site inspection ☒ Reviewing available designs and feasibility studies		
A.2.2	If a greenfield project, describe the physical implementation of the project when the validation was commenced.	/1/	DR	The project is integrated within the existing facilities of the recovery and reclamation sites respectively. The necessary modification and/or installations of new equipment specific to the project activity is installed within either of the respective facilities.		OK
A.2.3	If physical site visits were performed based on sampling (only applicable for bundled small scale projects, each with emission reductions not exceeding 15 000 tCO_2e per year), justify the sampling through a statistical analysis:	/1/	DR	N/A		OK
A.2.4	Is the description of the proposed CDM project activity as contained in the PDD sufficiently covers all relevant elements, is accurate and that it provides the reader with a clear understanding of the nature of the proposed CDM project activity?	/1/	DR	The location of the SF_6 recovery and reclamation project, South Korea (see details above in project description) and the geographical boundaries of the corresponding project activities are properly described in the PDD. The project location and boundaries were also confirmed during the site visit to both the recovery and the reclamation sites.	~~CAR9~~ ~~CAR21~~ ~~CAR22~~ ~~CL21~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				The boundaries to the project system are the Solvay and KERI sites and this information was verified during the site visit. However it shall be mentioned that in table B.3.2 "Emissions sources included or excluded from the project boundary", the PP indicates that there is no CO_2 emissions from the electricity/energy used at the recovery and reclamation sites, which is opposite to what is indicated in the methodology AM0079 version 02. However, during the site visit, DNV could confirm that such emissions are negligible since there are very few component that consume electricity within the project activity (PCs, gas spectrometer, compressor, vacuum pumps, and few instruments as flow meters, thermometers, etc.), its power consumption is small and their utilization is sporadic (approximately once a month). Therefore it can be concluded that there is not material emissions of CO_2 from electricity consumption resulting from the project activities.		
A.2.5	Does the project activity involve alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?	/1/	DR	The pre-project activity is the continuation of the current practice (baseline), which involves the facilities at the recovery and reclamation sites without any modification or extra equipment in this respect, while the post-project activity is the same installations with addition of the equipment specific to the project activity, which is clearly described in the PDD /1/	~~CAR20~~	OK
A.2.6	Does the project design engineering reflect current good practices?	/1/	DR	The audit performed during the site visit, showed that SFK is a well managed company with enough experience in its field and ample know-	~~CAR 3~~ ~~CAR 4~~ ~~CAR 5~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				how to properly manage technically-, environmentally- and businesswise the production of SF_6 gas. Regarding the design of the project (activities, components, etc.) the technical solutions reflect also, in general, the current good engineering practices, which is inline with the impressions of the main and major part the plant as described herein/above. However, some issues were identified (mainly related to the integrity and safe guarding of the system) that need to be improved. The PP also shall submit the QA/QC documentation, administrative manuals, and alike to verify the integrity of the project activity.	~~CL30~~ FAR 1 FAR 2 FAR 3 FAR 4 FAR 5 FAR 6	
A.2.7	Would the technology result in a significantly better performance than any commonly used technologies in the host country? Is any transfer of technology from any Annex-I Party involved?	/1/	DR	Yes, the project uses gas spectrometers and integrated flow meters (including temperature and pressure measurements) which increase the accuracy and reliability of the measurements.		OK
A.3	**Participation requirements (VVM para 51-54, 125-127)**					
A.3.1	Do all participating Parties fulfil the participation requirements as follows:	/1/	DR			OK
				Republic of Korea (host) / United Kingdom		
	a) Party has ratified the Kyoto Protocol			☒ Yes ☐ No / ☒ Yes ☐ No		
	b) Party has designated a Designated National Authority			☒ Yes ☐ No / ☒ Yes ☐ No		
	c) The assigned amount has been determined			☒ Yes ☐ No		
A.3.2	Do the letters of approval meet the following requirements?	/1/ /69/ /68/	DR	The PP shall present the LoAs from the involved Parties for validation. DNV has received copy of the LoAs and can confirm that the DNAs from both, the host	~~CAR 1~~	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			country /69/ and the Annex I country /68/, issued the respective LoAs for the specific project activity.		
			Republic of Korea (host) / United Kingdom		
a) LoA confirms that Party has ratified the Kyoto Protocol			☒ Yes ☐ No / ☒ Yes ☐ No		
b) LoA confirms that participation is voluntary			☒ Yes ☐ No / ☒ Yes ☐ No		
c) The LoA confirms that the project contributes to the sustainable development of the host country?			☒ Yes ☐ No / NA		
d) The LoA refers to the precise project activity title in the PDD			☒ Yes ☐ No / ☒ Yes ☐ No		
e) The LoA is unconditional with respect to (a) to (d) above			☒ Yes ☐ No / ☒ Yes ☐ No		
f) The LoA is issued by the respective Party's DNA			☒ Yes ☐ No / ☒ Yes ☐ No		
g) The LoA was received directly by the DNA or the PP			☐ DNA ☒ PP / ☐ DNA ☒ PP		
h) In case of doubt regarding the authenticity of the letter of approval, describe how it was verified that the letter of approval is authentic			DNV found no reason to doubt the authenticity of the LoA / DNV found no reason to doubt the authenticity of the LoA		
A.3.3 Have all private/public project participants been authorized by an involved Party?	/1/	DR	Yes, as specified each on their corresponding LoA.	~~CAR1~~	OK
A.4 Technical description of the project activity (VVM para 58-64)					
A.4.1 Is the project's location clearly defined?	/1/	DR	The location of the SF_6 recovery and reclamation project, South Korea (see details above in project description) and the geographical boundaries of the corresponding project activities are properly described in the PDD. The project location and boundaries were also confirmed during the site visit to both the recovery and the reclamation sites.	~~CAR2~~ ~~CAR 6~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				The boundaries to the project system are the Solvay and KERI sites and this information was verified during the site visit.		
A.5	**Public funding of the project activity**					
A.5.1	In case public funding from Parties included in Annex I is used for the project activity, have these Parties provided an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties?	/1/	DR	The proposed project does not involve any public funding as demonstrated in the financial analysis /39/, and DNV did not come across any information indicating that the project result in a diversion of official development aid		OK
B Application of a baseline and monitoring methodology						
B.1	**Methodology applied (VVM para 65-76)**					
B.1.1	Does the project apply an approved methodology and the correct and valid version thereof?	/1/	DR	The project activity applies the correct version of the methodology. However the PDD version 01 deviates from the methodology in the calculation of the project emission reduction's calculations. In this respect the PP will request a revision of the methodology to address this issue.	~~CAR 2~~ ~~CAR9~~	OK
B.1.2	If applicable, has any specific guidance provided by the CDM EB in respect to the applied methodology been considered?	/1/	DR	The following guidance was considered during the validation process: "Guidance on the assessment of investment analysis" / 51/, and the "Guidance on the demonstration and assessment of prior consideration of the CDM" /8/		OK
B.2	**Applicability of methodology (and tools) (VVM para 65-76)** *Insert a row for each applicability criteria of the applied methodology (and tools)*					
B.2.1	How was it validated that project complies with the following applicability criteria: insert applicability criteria 1?	/1/	DR	The Korea Electrotechnology Research Institute (KERI), the recovery site of the proposed project		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	The SF_6 recovery site uses SF_6 in the testing of gas insulated electrical equipment (GIEE) (e.g. circuit breaker, switchgear). Such tests are performed as part of a certification or rating process, or during production or development of new electrical equipment. /3/			activity, is an accredited High Power and High Voltage Testing Facility providing testing and certification services for GIEE /13/ /14/, where SF_6 is used in the testing of GIEE.		
B.2.2	How was it validated that project complies with the following applicability criteria: insert applicability criteria 2? The testing considered for the project is Electrical Tests of medium and high voltage rated equipment (>1kV) /3/	/1/	DR	Tests to be considered at the KERI site for this project include equipment from >1kV and suitable records are available/14/.		OK
B.2.3	How was it validated that project complies with the following applicability criteria: insert applicability criteria 3? Before the project, SF_6 gas used in the equipment for tests is vented following testing /3/	/1/	DR	Before the project, KERI's customers have been routinely venting the used SF_6 from equipment after the completion of the various electrical tests /16/ /17/ /18/, and refill the equipment with new SF_6 for the execution of new tests (the installation and removal of the electrical equipment within the testing facilities, and as well as the filling and venting of SF_6 gas is performed by the equipment manufacturer. KERI performs exclusively the actual electrical testing.) Given that KERI is the only testing facility within the region able to perform tests that result in the contamination of SF_6 gas, then the practice exercised at KERI by its customers of venting the contaminated SF_6 gas can be considered common practice.		OK
B.2.4	How was it validated that project complies with the following applicability criteria: insert applicability criteria 4? There is no option to reuse the vented SF_6 in the SF_6 recovery site /3/	/1/	DR	• Vented SF_6 is used SF_6 from the test equipment. Such contaminated SF_6 can not be used for further tests because it is no longer in accordance with IEC 60376, which is th required SF_6 gas standard for the GIEE tests /19/ • As indicated in the application for test records		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				/15/, manufacturers that order the GIEE tests, require to test their equipment under strict adherence to the standard IEC 60376 /19/, and therefore the quality of the SF_6 gas shall have a high level purity as specified in the IEC 60376 standard /19/. • According to IEC 60480 /74/, used SF_6 gas is only suitable for re-use when equipment is maintained, repaired or reaching the end of its service life, thus it is not explicitly suitable for use in equipment for type tests, performance tests or tests during equipment development. In the case of KERI, the company only focuses in testing of the high and ultra high voltage equipment, and their activities do not involve maintenance or repair of such equipment /13/ /14/.		
B.2.5	How was it validated that project complies with the following applicability criteria: insert applicability criteria 5? The recovered gas is reclaimed by using it as a feedstock in the production of new SF_6 on the premises of an existing SF_6 production facility /3/	/1/ /3/	DR	As confirmed during DNV's visit to the project site, the recovered gas is reclaimed by using it as a feedstock in the production of new SF_6 on the premises of the existing SF6 production facility, which started operation in May 2007, at Solvay Fluor Korea Co. Ltd. (SFK) site in South Korea.		OK
B.2.6	How was it validated that project complies with the following applicability criteria: insert applicability criteria 6? Recovered gas injected for reclamation process is directly merged with the flow of gas in the production line of SF_6 newly produced and the two becomes indistinguishable. Furthermore, there are no possible cause of leakage (e.g. purge outlets) between the point of injection and the point of merging	/1/	DR	As confirmed during DNV's visit to the project site, the recovered gas is injected into the production line for the newly produced SF_6 gas on the premises of the existing SF_6 production facility at Solvay Fluor Korea Co. Ltd (SFK) site. DNV confirms that SFK installations have no possible causes of leakeage between the point of injection of the used SF_6 gas and the point of point of merging it with the newly produced SF_6		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				gas.		
B.2.7	How was it validated that project complies with the following applicability criteria: insert applicability criteria 7? Reclaimed SF_6 is a minor component of the total SF_6 production of the SF_6 reclamation site (less than 5% of total production) /3/	/1/	DR	SFK's total design production capacity of SF_6 is around 1 500 tonnes per year /62/. The maximum reclamation rate of the proposed project activity is approximately 4.3 kg/hr of used SF_6 /20/. Assuming 7 920 hr/yr of operation /65/, the total amount of SF_6 gas reclaimed per year would not be more than 34.05 tonnes per year. Hence, the reclaimed SF_6 would represent less than 3% (more precisely 2.3%) of total SF_6 production	~~CL1~~ ~~CL45~~ ~~CL46~~ ~~CL47~~ ~~CL50~~	OK
B.2.8	How was it validated that project complies with the following applicability criteria: insert applicability criteria 8? Issuance requests shall be formulated for periods of at least one year as the procedures to remove the possibility of gaming are designed on a yearly basis /3/	/1/	DR	The issuance request will be formulated for periods of at least one year in order to remove the possibility of gaming (FAR 5).	FAR 5	OK
B.2.9	How was it validated that project complies with the following applicability criteria: insert applicability criteria 9? The testing is performed at the request of a client according to a national or international standard, and the facility operator has no discretion in the type or frequency of tests /3/	/1/	DR	• KERI, the testing facility operator, has not influence on the decision to select neither the test type nor the frequency of tests. KERI's customers decide such parameters as indicated in the Application for Test records /15/. • In the Application for Test records /15/ KERI's customers specify the testing protocols required for the equipment to be tested. These protocols comply with detailed international testing standards for defined testing requirements.		OK
B.2.10	How was it validated that project complies with the following applicability criteria: insert applicability criteria 10? Application of the procedure to identify the baseline scenario must result in a baseline involving the venting of SF_6 as the	/1/	DR	In the absence of the project activity the most likely scenario is continuation of the normal of practice of venting the used SF_6 gas at the recovery site /16/ /17/ /18/.		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	most plausible scenario of the SF_6 recovery site /3/					
B.2.11	How was it validated that project complies with the following applicability criteria: insert applicability criteria 11? "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" /6/	/1/	DR	During the transportation of the cylinders bundle to and from the project sites (recovery and reclamation), the project activity will lead to project emissions (leakages) caused by burning fossil fuel (diesel for the transport vehicle). The CO_2 emissions from the fossil fuel combustion will then be calculated based on the Tool /6/, based on the quantity of the fuel combusted and its properties. However, as demonstrated here, this emission is negligible and therefore considered to be zero.		OK
B.2.12	How was it validated that project complies with the following applicability criteria: insert applicability criteria 12? "Combined tool to identify the baseline scenario and demonstrate additionality" /4/	/1/	DR	As demonstrated below, all potential alternative scenarios as specified in the approved methodology AM0079 /3/, relevant to the project activity are available to project participants (could be implemented by the project participants), thus complying with the applicability criteria of the Tool /4/.		OK
B.2.13	How was it validated that project complies with the following applicability criteria: insert applicability criteria 13? "Tool to calculate baseline, project and/or leakage emissions from electricity consumption"/5/	/1/	DR	As indicated in the applicability criteria of the Tool /5/, if a project activity obtains all the electricity from the grid, such project activity can use this Tool in the calculations of project emissions. In the case of the proposed project activity, the electricity required for each of both sites (recover and reclamation) is supplied by the grid, thus complying with the applicability criteria of this Tool /5/.		OK
B.2.14	Is the selected baseline one of the baseline(s) described in the methodology and this hence confirms the applicability of the methodology?	/1/	DR	Yes. The methodology itself was prepared and proposed by the PP (ESL) with the intention to apply it to this specific project, thus the methodology applicability criteria are fulfilled.	~~CL45~~ ~~CL46~~ ~~CL47~~ ~~CL55~~	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			Furthermore, in line with VVM paragraph 75 /7/, in section 4 above "Validation Findings" the detail analysis of each applicability criteria and description of the steps taken to assess the relevant information contained in the PDD and other reference documents, against these criteria.. Furthermore, likewise with the applicability criteria of the tools referred to in the methodology, the steps taken for the assessment of the fulfilment of these criteria against the PDD, are presented in detail. Both the applicability criteria of the approved methodology /3/ and the corresponding Tools /4/ /5/ /6/ are fulfilled.	~~CL56~~	
B.3 Project boundary (VVM para 78-80)					
B.3.1 What are the project's system boundaries (components and facilities used to mitigate GHGs)? Are they clearly defined and in accordance with the methodology?	/1/	DR	The boundaries to the project system are the Solvay and KERI sites and this information was verified during the site visit. However it shall be mentioned that in table B.3.2 "Emissions sources included or excluded from the project boundary", the PP indicates that there is no CO_2 emissions from the electricity/energy used at the recovery and reclamation sites, which is opposite to what is indicated in the methodology AM0079 version 02. However, during the site visit, DNV could confirm that such emissions are negligible since there are very few component that consume electricity within the project activity (PCs, gas spectrometer, compressor, vacuum pumps, and few instruments as flow meters, thermometers, etc.), its power consumption is small and their	~~CAR 2~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				utilization is sporadic (approximately once a month). Therefore it can be concluded that there is not material emissions of CO_2 from electricity consumption resulting from the project activities.		
B.3.2	Which GHG sources are identified for the project? Does the identified boundary cover all possible sources linked to the project activity? Give reference to documents considered to arrive at this conclusion.	/1/	DR	There are only 2 types of GHG sources the SF_6 and the CO_2 gases considered during the project activity as specified in the reference documentation /13/ /14/ /15/ /19/ //21/ 22/ /35/ /45/ /52/ /70/ /71/ and in section 4.4 above		OK
B.3.3	Does the project involve other emissions sources not foreseen by the methodologies that may question the applicability of the methodology? Do these sources contribute with more than 1% of the estimated emission reductions of the project?	/1/	DR	All project emissions, as menitoned on B.3.2 and B.3.1 above, are duly considerd by the methodology		OK
B.4	**Baseline scenario determination (VVM para 81-88, 105-107)** *Ensure that the evaluation of all alternatives provided in the PDD and required by the methodology and also possible alternatives/offshoots of alternatives are discussed. Check that all alternatives required to be considered by the methodology are included in the final PDD. If baseline alternatives required to be considered by the methodology are considered not applicable, please assess the justification for this.*					
B.4.1	Which baseline scenarios have been identified? Is the list of baseline scenarios complete?	/1/	DR	Four (4) alternative scenarios were considered by the PP according to the methodology: 1) Continuation of the current situation where used SF_6 gases will be vented in the atmosphere at a testing facility — baseline	~~CAR6~~ ~~CL 37~~ ~~CL 48~~	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			scenario. 2) Capture of the used SF_6 gases at the testing facility site and incineration of the gases at an existing or new incineration facility — This alternative would face economic barriers as incineration does not offer any revenue and has high economic costs due to the high temperatures (and so energy requirements) necessary to break down SF_6. Incineration of SF_6 offers no compensation and there is no legal requirement to incinerate SF_6. Therefore this alternative is not considered viable 3) Capture of used SF_6 gases at the testing facility site and recycling of the gases to an existing or new SF_6 manufacturing facility in the Host Country (project scenario) implemented without considering CDM revenues — This alternative is not viable without CDM revenues since there is no incentives (legal, economical, etc.) that will facilitate or promote its implementation. 4) Capture and transport of used SF6 to other facilities for reclamation — This alternative would require to have other reclamtion facilities, different than SFK, to reclaim the SF_6 gas out of the contaminated recovered gas. However there is no facility in the Host country other than SFK for this purpose.Therefore this alternative is not		

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				considered viable.		
B.4.2	How have the other baseline scenarios been eliminated in order to determine the baseline?	/1/	DR	See explanation under each alternative scenario in section B.4.1 above		OK
B.4.3	What is the baseline scenario?	/1/	DR	In section B.5. of the PDD it is demonstrated that the Project's baseline scenario is the continuation of the current situation where used SF_6 gases will be vented in the atmosphere at a testing facility.		OK
B.4.4	Is the determination of the baseline scenario in accordance with the guidance in the methodology?	/1/	DR	The PP has used the "Combined tool to identify the baseline scenario and demonstrate additionality" in this process. As per the applicability criteria of this tool, all potential alternative scenarios to the proposed project activity are available options to PP. Furthermore, as it shown in the PDD, the PP followed the 4 steps procedure specified in the tool, I- Identification of alternative scenarios (see B.2.2 above), II – Barrier analysis.- No barrier were identified. III – Investment Analysis.- Using the WACC of Solvey SA (9.26%) /40/, the project NPV is -$143,651 and $7,495,498 without and with carbon revenues respectively /39/. IV – Common Practice Analysis.- KERI is the only High Power High Voltage Testing Facility in the Host Country /66/ and KERI's customers vent waste SF_6 gas /16/ /17/ /18/. Also SFK, is only one SF_6 manufacturing facility in the Host Country that manufactures SF_6 gases and only one facility	~~CAR2~~ ~~CAR 6~~ ~~CAR 7~~ ~~CL 38~~ ~~CL 40~~ ~~CL 42~~ ~~CL 44~~ ~~CL 55~~ ~~CL 56~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				that is planning to introduce a recycling process (in both cases, the project developer). However, the PP shall present further evidence that venting of waste SF_6 gas has been the common practice. The PP shall also justify further the uniqueness of the KERI conditions compared to similar businesses in other countries.		
B.4.5	Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR	Yes. However is worth mentioning that the methodology applicability criteria establish already a very conservative scenario. The baseline scenario consists on the venting of the waste SF_6 gas, and since the potential revenues from the CDM mechanism are vey small compared to the main/original activities of both companies involved in the process (KERI and SFK), it is highly unlikely that there will be any increase of the baseline conditions due to the potential revenue a given change could represent.		OK
B.4.6	Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR	The PP has done the industry evaluation as indicated in the PDD, the project activity is a minor variation to the main activities of the PPs, therefore it is reasonable to expect that national and sectorial policies regarding their main activities also cover the project activities. However, it shall submit the letter of approval from the DNA's to ensure compliance with national priorities.	~~CAR 1~~	OK
B.4.7	Is the baseline scenario determination compatible with the	/1/	DR	Yes, the baseline scenario presented in the PDD	~~CAR 6~~	OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	available data and are all literature and sources clearly referenced?			/1/ is according with the available information and what was observed and the interviews held during the site visit. However the PP is requested to present further evidence of the industry practice. The PP shall present to DNV evidence showing that the average prices of the SF_6 have remained within the same range from 2007 to 2009 (9.5-10.5 USD) /59/.	~~CAR 7~~ ~~CL2~~ ~~CL5~~ ~~CL 26~~ ~~CL 44~~ ~~CL51~~	
B.4.8	Is the baseline determination adequately documented in the PDD? • All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced. • All documentation is relevant as well as correctly quoted and interpreted. • Assumptions and data can be deemed reasonable • Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. • The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity	/1/	DR	Yes, all assumptions and data used by the project participants are listed in the PDD and related documentation and has been presented to DNV for validation. The documentation presented is relevant to the project activity and the corresponding assumptions made seem reasonable within the frame of the industry practices and the project activity. The relevant national and sectorial policies and practices are considered and mentioned in the PDD, and the methodology has been correctly applied as to identify and verify that the continuance of the common practice, venting of the used SF_6 gas after testing of the GIEE, would be most likely scenario in the absence of of the proposed project activity.	~~CL2~~	OK
B.5	**Additionality determination (VVM para 94-121)**					
B.5.1	What approach/tool does the project use to assess additionality? Is this in line with the methodology?	/1/	DR	Yes, the project's additionality has been assessed as per the methodology and the combined tool to identify the baseline scenario and demonstrate additionality /4/. See also question B.4.4 above. However the	~~CAR 6~~ ~~CAR 7~~ ~~CAR22~~ ~~CL 27~~ ~~CL 44~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				PP is requested to present further evidence of the business practice and uniqueness of KERI's conditions related to the project additionality.		
B.5.2	Have the regulatory requirements correctly been taken into account to evaluate the project activity and the alternatives?	/1/	DR	Yes, during the site vist DNV was able to verify that the baseline scenario, the alternative of incineration /46/ (document ""7-06-Cost of Destruction of SF6.pdf") – since other alternatives relates to the continuation of the basleine scenario- and the business activities of the PP (SFK and KERI) were within the regulatory requirements of the host country /41/ /44/.		OK
B.5.3	Is sufficient evidence provided to support the relevance of the arguments made?	/1/	DR	Yes, in general the methodology specifies the considerations made for assessing the applicability and additionality of the project. However the PP is requested to present further evidence for some of the estimations or considerations made d(see specific clarifiactions listed in this section). The corresponding evidences for the issues raised have been presented by the PP and found sufficient by DNV..	~~CL 1~~ ~~CL 2~~ ~~CL 3~~ ~~CL 4~~ ~~CL 5~~ ~~CL 9~~ ~~CL 10~~ ~~CL 11~~ ~~CL 12~~ ~~CL 13~~ ~~CL 14~~ ~~CL 15~~ ~~CL 16~~ ~~CL 17~~ ~~CL 18~~ ~~CL 19~~ ~~CL 20~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
					~~CL 21~~ ~~CL 22~~ ~~CL 23~~ ~~CL 24~~ ~~CL 25~~ ~~CL 28~~ ~~CL 36~~ ~~CL 49~~ ~~CL 50~~ ~~CL 52~~ ~~CL 54~~	
B.5.4	What is the project additionality mainly based on (Investment analysis or barrier analysis)?	/1/	DR	The project additionality is mainly based on the demonstration that without the CDM benefits there is no financial incentives to pursue other than the baseline scenario, hence investment analysis.		OK
Prior consideration of CDM (VVM para 98-103)						
B.5.5	What is the evidence for serious consideration of CDM prior to the time of decision to proceed with the project activity?	/1/	DR	The PP shall present further detailed evidence of the CDM considerations made and the corresponding determination of the project start date. The PP has presented enough evidence to substantiate that the project start date is 23 November 2007, which is the date SFK signed the PO from the supplier for the DILO compressor /11/ /31/. The main evidence on CDM consideration prior	~~CL28~~ ~~CL 29~~ ~~CL 6~~ ~~CL 7~~ ~~CL11~~ ~~CL28~~ ~~CL 34~~ ~~CL 35~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				the start of the project activity, are the 6 events/actions taken by the PP between 7 October 2004 inclusive (discussion between SFK and the N.Serve consultant on the potential of the project as CDM project activity) /24/ and 23 November 2007 (signature of the PO for the main equipment of the project activity) /31/, as described in section 4.5.1 (Evidence for prior CDM consideration and continuous actions to secure CDM status) above.		
B.5.6	If the starting date is after 2 August 2008 and before the global stakeholder consultation, has the DNA and UNFCCC confirmed that the project participants have informed in writing of the project's intention to seek CDM status?	/1/	DR	The project activity starting date is 23 November 2007 /31/.		OK
	Continuous efforts to secure CDM status (only to be completed if starting date is before 2 August 2008)					
B.5.7	What initiatives where taken by the project participants from the starting date of the project activity to the start of validation in parallel with the physical implementation of the project activity?	/1/	DR	1. 7 October 2004 Discussion between SFK and consultancy 'N.Serve' about CDM opportunities for SF_6 recycling /24/ 2. 30 May 2006 CDM Presentation by consultancy 'RCC' /25/ /26/ 3. 25 September 2006 Meeting KERI – SFK /27/ 4. 18 January 2007 Quotation issued for SF_6 Compressor /28/ 5. 20 April 2007 Email from SFK to Solvay HQ with summary CDM proposal /29/ 6. 12 October 2007 Letter of Commitment between EcoSecurities and SFK /30/		OK
B.5.8	When did the construction of the project activity start?	/1/	DR	The project activity does not involve any		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				construction other than the installation of the equipment/components specifically related to the project activity and additional to the facilities, infrastructure and equipment currently in operation by SFK and KERI respectively. The PO for the major/main component specific to the project activity was signed on 23 November 2007 /31/		
B.5.9	When was the project commissioned?	/1/	DR	The production start date for the project activity is 2 June 2008 /45/ (6-1 start date recovery and reclamation report_02Jun08)		OK
B.5.10	Does the timeline of the project confirm that continuous actions in parallel with the implementation were taken to secure CDM status?	/1/	DR	Yes see section 4.5.1 (Evidence for prior CDM consideration and continuous actions to secure CDM status) above. And section B. 5.7 above.		OK
	Investment analysis (VVM para 108-114) *The list of questions below must be adjusted to the parameters in the investment analysis relevant to the project under validation.*					
B.5.11	Does the project activity or any of the remaining alternatives generate revenues apart from CDM? Is this reflected in the PDD?	/1/	DR	As reflected in the analysis of alternative scenarios in the PDD /1/, there are some financial savings (rather than revenues) generated by the cutback on raw materials when used SF_6 gas is injected into the production line of new SF_6 gas. However these are not sufficient to raise the financial attractiveness of the project above the benchmark as demonstrated in the financial analysis./39/.	~~CL26~~ ~~CL54~~	OK
B.5.12	Do any of the alternatives to the project activity involve investment? Is this reflected in the PDD?	/1/	DR	Yes, except for the continuance of the current practice both the alternative of the project activity with or without CDM benefits, and the incineration of the used gas require some level of		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				investment. This is reflected in the PDD /1/ and the investment analysis/39/.		
B.5.13	Is the choice of benchmark analysis, investment comparison or simple cost analysis correct?	/1/	DR	In accordance with the "Combined tool to identify the baseline scenario and demonstrate additionality" /4/, and given that neither of the alternatives generate revenues (rather cost savings) /39/, an investment comparison analysis based on the Net Present Value (NPV) of the project cash flows is used to compare /1/ /39/ the two remaining alternatives, namely, the project activity with and without CDM benefits.	~~CL16~~ ~~Cl49~~	OK
B.5.14	Is the benchmark/discount rate the latest available at the time of decision?	/1/	DR	Yes, the benchmark used is consistent with the company's (SFK) practice and policies /45/ /64/ /67/ /71/.		OK
B.5.15	What is the financial indicator? Is it on equity/project basis? Before/after tax? Is the financial indicator in correspondence with the benchmark?	/1/	DR	The investment comparison analysis is based on the Net Present Value (NPV) of the project cash flows is used to compare /1/ /39/ the two remaining alternatives, namely, the project activity with and without CDM benefits.		OK
B.5.16	Are the underlying assumptions appropriate, e.g. what is considered as waste in the baseline is considered to have zero value?	/1/	DR	Yes, all the assumptions made are adequate and consistent throughout the alternative scenarios (e.g. equipment common to the incineration and project activity scenarios is included in the investment analysis of both scenarios /39/).	~~CL12~~	OK
B.5.17	Does the income tax calculation take depreciation into account? Is the depreciation year in accordance with normal accounting practice in the host country?	/1/	DR	Yes, the depreciation has been appliaed to the revenues only for tax purposes and added afterwards./39/, and is accorindg to the normal accounting practices and law of the host country. /39/.	~~CL20~~ ~~CL36~~	OK
B.5.18	Is the time period of the investment analysis and operating time of the project realistic? Has salvage value been taken into account? Is working capital returned in the last year of	/1/	DR	Yes. The time period for the project activity is 20 years, which is reasonable for the equipment used and the specifications of the manufacturers of the		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	operation?			main component (DILO compressor) /10/. The project has not allocated any working capital, since it is included within the normal operations of the facilities. Finally there is no salvage value since, although the (main) components are reasonably estimated to have a lifetime of 20 years, it is not likely to last much longer than that without a major overhaul, and other minor components (piping, etc.) is likely to require it at an earlier stage.		
B.5.19	When a feasibility study report or similar approved by the government is used as the basis for the investment analysis: Can it be confirmed that the values used in the PDD are fully consistent with the FSR and is the period of time between finalization of the FSR and the investment decision adequate?	/1/	DR	N/A		OK
B.5.20	How was the amount of output (e.g. sales of electricity) assessed? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/ /7/	DR	☐ The plant load factor provided to banks and/or equity financiers while applying the project activity for project financing, or to the government while applying the project activity for implementation approval ☐ The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company) ☒ Other approach. The plant load factor has been determined based on the reclamation site records gathered between July 2008 and February 2009 /20/, and the design data of the plant /45/ /65/. The project activity's output is based exclusively in the cost savings derived from the injection of used (contaminated) SF_6 gas into the production line of new SF_6 gas.	~~CL54~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				From this perspective both; the cost for cutting-back raw materials to produce new gas due to amount of contaminated SF_6 gas injected into the production line, and the amount itself (volume) of contaminated SF_6 gas injected were properly considered, and the PP presented sufficient evidence to demonstrate the values presented in the investment analysis. The costs of raw materials used in the production of new SF_6 gas were justified via invoices from the corresponding suppliers /45/ to SFK, while the amount of SF_6 injected has been determined, originally on estimations obtained from the GIEE data and records kept at KERI /15/, and confirmed through the historical records obtain via the project activity itself /20/ /34/ /35/ /45/.		
B.5.21	How was the output price (e.g. electricity price) assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/ /7/	DR	☒ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☐ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants *Not applicable since the project does not have revenues, Furthermore, this is the only project that is applying the approved methodology, and none project has been register under this methodology neither.*		OK
B.5.22	How were the investment costs assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/ /7/	DR	☒ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☐ Review of feasibility reports, public announcements, contracts and annual financial reports related to the project and the project participants	~~CL18~~	OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				Given that the project has been constructed and is in operation, it has been possible to verify the investment cost against 3rd party documents such as the actual invoices and other related documents (PO, quotation, etc.) /45/ /37/ /28/.		
B.5.23	How were the O&M costs assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/ /7/	DR	☐ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☒ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants The O&M costs have been verified against the PP's internal documentation related to their own operational costs /38/, and invoices of raw materials and consumables such as electricity, etc./45/	~~CL9~~ ~~CL10~~ ~~CL17~~ ~~CL18~~ ~~CL39~~ ~~CL40~~ ~~CL41~~ ~~CL42~~ ~~CL43~~	OK
B.5.24	Describe the assessment of the other input parameters. Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/ /7/	DR	☐ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☐ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants All input parameters: amount of used SF_6 gas, cost savings due to the re-utilization of contaminated SF_6 gas instead of producing it from raw materials, investment and O&M costs, and the choice of benchmark have already been discussed above in this section.		OK
B.5.25	Was the financial calculation spreadsheet verified and found to be correct?	/1/	DR	Yes, the inputs and calculations presented in the financial analysis /39/ have been revised and	~~CL12~~ ~~CL13~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				cross checked against the references and evidence provided by the PP and found to be correct.	~~CL14~~ ~~CL15~~ ~~CL38~~ ~~CL40~~	
B.5.26	Sensitivity analysis: Have the key parameters contributing to more than 20% of the revenue/costs during operating or implementation been identified? Has possible correlation between the parameters been considered?	/1/	DR	The 3 main factors that affect the financial attractiveness /39//45//64/ /71/of the project activity are: 1. Increasing the project revenue by either: a) increasing the amount of used (contaminated) SF_6 gas, and b) increasing the savings on raw materials and other consumables (energy, etc.) used in the production of new SF_6 gas (which would have been produced in the absence of injecting the contaminated/used SF_6 gas). Considering option a) the amount of used SF_6 available to inject into the production of new SF_6 is merely dependent on the volume of used SF_6 gas resulting from the testings of GIEE. In addition that this is out of the control of the project participants, there is no indication to expect that this will increase from the levels shown by current records (9.7 tonnes per year /20/), to such a values that will make the project financially attractive, in particular, since modern GIEEs tend to use less SF_6 to comply with the demands of end users. With regards to point b), in order to bring the NPV at least to a zero value, at a discount rate equivalent to the benchmark value of 9.26% /45//64//71/, the savings on	~~CL9~~ ~~CL10~~	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			the cost should increase by 155% /39/(in other words reduce costs by 155%). For this to take place the price of the raw materials should reduce proportionally. However any change on the price of the raw material will have a direct effect on the market price of the SF_6, which according to the evidence presented /45/ /57/ /59/ it has been stable in the last years, there is no indication supporting the possibility that the costs of the raw materials will decrease in such order of magnitude (155%), such that the resulting savings would make the project financially attractive. This scenario is therefore unlikely. 2. Reduction of the investment costs. Similar to the point above, the reduction of the investment costs that could bring the project to a zero NPV value with a financial reference of 9.26% /45//64//71/ (and thus making the project financially attractive /39//45//64/ /71/), would have to be in the order of 185% /39/. However, since this change would be even higher than the scenario where all the investment value were to be written off completely (100%) from the analysis, it is unrealistic to expect this to happen. Therefore this scenario is unlikely. 3. Once again , similar to the points 1 & 2 above, In order to bring the project to a zero NPV at a benchmark rate, thus increasing the financial attractiveness of the project		

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				activity without the CDM benefits/39/, it would be necessary to reduced the operational costs 93,81% /39/. The operational costs involve labour costs both at KERI and SFK, laboratory and transport costs, and chemicals/materials for h the purification of the used SF_6 /39/ /45/ /38/. Considering that the labour and transport costs represent 90% of the O&M costs /39/. This means that, in total terms, these 2 factors would have to decrease by approximately 84% in order to bring the project to a zero NPV value. Such a reduction for either of these 2 factors is not feasible since both drivers are rather basic (labour costs and transportation of the bundles between the 2 sites), and if anything these will tend to increase due to inflation, rather than decreasing. Therefore this scenario is unlikely.		
B.5.27	Sensitivity analysis: Is the range of variations is reasonable in the project context?	/1/	DR	Yes. See B.5.26		OK
B.5.28	Have the key parameters been varied to reach the benchmark and the likelihood of this to happen been justified to be small?	/1/	DR	Yes. See B.5.26		OK
	Barrier analysis (VVM para 115-118)					
B.5.29	Are the barriers identified complimentary to a potential investment analysis? Does the barrier have a clear impact on the financial returns so that it can be assessed in an investment analysis? Each barrier is discussed separately.	/1/	DR	The main barrier faced is the lack of financial attractiveness of the project, /35/ and the PP chose to demonstrate the additionality of the project via the investment analysis /1/ /39/ rather than the barrier analysis.	~~CL37~~	OK
B.5.30	How were the investment barriers assessed to be real? Are	/1/	DR	The main investment barrier is due to the fact that		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	the investment barriers substantiated by a source independent of the project participants?			there is no incentives to change from the current practice of venting, and the savings in raw materials and internal costs from injecting the used/contaminated SF_6 gas into the production line of new SF_6 gas are so small that, only on its own, it does not make the project activity enough financially attractive, thus crating a barrier to be executed. All costs external to the project activity (raw materials and consumable s such as electricity) have been cross checked against external documentation, and internal costs (labour costs, etc.) have been validated against internal company documentation. /39/ /45/ /38/. See also B.5.20 & B.5.265 above.		
B.5.31	How does CDM alleviate the investment barriers?	/1/	DR	The CDM benefits eliminate the investment barrier by making the project financially attractive, since it raises the IRR of the project activity /39/ above the 9.26% /39/ /45/ /64/ /67/ /71/ benchmark value, used as a reference for the financial attractiveness of the project activity, and in consistency with the company's (SFK) practice and policies /45/ /64/ /67/ /71/.		OK
B.5.32	Is the project activity prevented by the investment barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	No, the only alternative to the project activity without CDM benefits, it's the incineration of the used SF_6 gas /39/, which in a similar way as for the project activity, it involves an investment /37/ /45/ and operating costs /45/ that can not be recovered under the current conditions. Therefore there is no incentive for any company to undertake such costs or pursue such activity.		OK
B.5.33	How were the technological barriers assessed to be real? Are the technological barriers substantiated by a source	/1/	DR	N/A – See B.5.29		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	independent of the project participants?					
B.5.34	How does CDM alleviate the technological barriers?	/1/	DR	N/A – See B.5.29		OK
B.5.35	Is the project activity prevented by the technological barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	N/A – See B.5.29		OK
B.5.36	How were the barriers due to prevailing practise assessed to be real? Are the barriers due to prevailing practise substantiated by a source independent of the project participants?	/1/	DR	N/A – See B.5.29		OK
B.5.37	How does CDM alleviate the barriers due to prevailing practise?	/1/	DR	N/A – See B.5.29		OK
B.5.38	Is the project activity prevented by the barriers due to prevailing practise and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	N/A – See B.5.29		OK
B.5.39	How were the other barriers assessed to be real? Are the other barriers substantiated by a source independent of the project participants?	/1/	DR	N/A – See B.5.29		OK
B.5.40	How does CDM alleviate the other barriers?	/1/	DR	N/A – See B.5.29		OK
B.5.41	Is the project activity prevented by the other barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	N/A – See B.5.29		OK
	Common practice analysis (VVM para 119-121)					
B.5.42	What is the geographical scope of the common practice analysis? Is this justified?	/1/	DR	There are few companies that has the possibility to test ultra-high voltage gasi insulated electrical equipment (GIEE), and thus the geographical scope of the common practice includes South Korea, Japan and Taiwan, given that all the equipment tested at KERI during 2007 (relevant year for determining the baseline /15/) came from these locations.	~~CAR 6~~ ~~CAR7~~ ~~CL27~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				Within this area, testing facilities in Japan are excluded since Japan is an Annex 1 country with a different regulatory framework (not a comparable environment), and other existing testing facilities within Taiwan (www.tertec.org.tw/_english/index.htm) and Korea (http://eng.lsis.biz/rnd/rnd_02.asp) do not provide high power testing services where the contamination of SF_6 gases is likely to occur. Therefore, from the CDM perspective KERI has unique conditions within the geographical area.		
B.5.43	What is the scope of technology and size (e.g. capacity of power plant) for the common practice analysis and how has this been justified?	/1/	DR	As per the applicability conditions, the testing consider for the GIEE must be higher than 1kV /3/. The filling of the gas insulated electrical equipment (GIEE) is done as per the international standard IEC 60376 /19/. In the case of the project activity the records for 2007 /15/, show that the testing of the equipment ranged between 40 and 800 kV. Furthermore the current practice of venting the used SF_6 gas was confirm by 3 of KERI's customers /16//17//18/. It should be mentioned that the in the standard practice for testing gas insulated electrical equipment (GIEE), it is the manufacturer of the GIEE who installs and removes the equipment from the testing bay. Therefore the manufacturers themselves are the ones that vent the used SF_6 within KERI's facilities after the testing is completed and prior to uninstall/dismantle the equipment for transport purposes, or, prior to perform further testing requiring new SF_6 gas.	~~CL27~~ ~~CL44~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5.44	What is the data source(s) used for the common practice analysis?	/1/	DR	The sources for the common practice analysis are: 1) Applicability conditions of the approved methodology /3/ 2) The international standard for GIEE testing IEC 60376 /19/ 3) The records of the GIEE testing performed during 2007 /15/who were in compliance with the applicability conditions of the methodology /3/ 4) The letter from 3 of KERI's customers for GIEE testing declaring that the common practice involves the venting of used SF_6 /16//17//18/. 5) DNV's site visit to KERI (and SFK) facilities.	~~CAR7~~	OK
B.5.45	How many similar non-CDM-projects exist in the region within the scope?	/1/	DR	Given that, as explained in B.5.42, KERI has unique conditions within the scope of the geographical area for the common practice analysis, there is therefore none similar non-CDM projects in the same geographical area.	~~CAR6~~ ~~CAR7~~	OK
B.5.46	How were possible essential distinctions between the project activity and similar activities assessed?	/1/	DR	N/A – See B.5.45	~~CAR6~~ ~~CAR7~~	OK
B.5.47	What is the conclusion of the common practice analysis?	/1/	DR	DNV's conclusion is that the practice in KERI's facilities of venting the used/contaminated SF_6 gas is actually the common practice within the scope of the geographical area.	~~CAR6~~ ~~CAR7~~	OK
Conclusion						
B.5.48	What is the conclusion with regard to the additionality of the project activity?	/1/	DR	DNV's opinion is that based on the evidences presented by the PP (see sections B.5.1 through to B.5.47 inclusive), and the site visit DNV	~~CAR6~~ ~~CAR7~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				performed at the SFK and KERI's facilities, the proposed project activity is additional according to the approved methodology /3/ and the "Combined tool to indentify baseline scenario and demonstrate additionality" /4/		
B.6	**Calculations of GHG emission reductions**					
	Data and parameters that are available at validation and that are not monitored (VVM para 199-203)					
B.6.1	How was the Global warming potential of SF_6 (GWP_{SF6}) verified?	/1/	DR	The global warming potential of the SF_6 (23 900 tCO_2e/tSF_6) was obtained from the IPCC /21/	~~CAR21~~	OK
B.6.2	How was the concentration of SF_6 in used gas in the baseline ($w_{SF6,hist}$) verified?	/1/	DR	The concentration of SF_6 gas of 99.6914% was obtained from 50% most contaminated bundles based on the laboratory (Gas Chromatography) analysis made on the gas recovered in the bundles numbers (labelled) CDM-08001 /34/ through to CDM-08006, and CDM-09001, that were used under the project activity during the period of approximately 8 months (1 June 2008 to 20 January 2009) /35/,		OK
B.6.3	How was the used gas vented during eligible testing item *t* for the historical baseline year, 2007, ($TI_{SF6,used,t}$), verified?	/1/	DR	The amount of used gas vented during eligible testing item *t* for the historical baseline year (2007), was obtained based on the historical records from the GIEE testing in KERI during 2007 /15/, and that fulfilled the applicability conditions. The actual volumes of gas for each GIEE were obtained from the nameplate data of the equipment (when available), or, the default SF_6 capacities presented tables B.1 & B.2 within Annex B of the approved methodology /3/		OK
B.6.4	How was the decision flow chart for the destination of removed SF_6 verified?	/1/	DR	The decision-making flowchart used is the same as the one presented in the approved		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				methodology /3/, the signals and criteria governing the flow within the flow chart is presented in Annex 3 of the PDD and the records analysed are those used for the reconstruction of the baseline sampled throughout 2007 /15/		
B.6.5	How was the sub-index (k) used for equipment categories verified?	/1/	DR	The sub-index "k" has been determined according to the approved methodology and the GIEE tested during 2007 (testing records used for the reconstruction of the baseline) /15/. The approved methodology /3/ 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(from the perspective of the project activity historic sample is also the project sample). 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 k categories /1/ in order to comply with the minimum amount of equipment tested per category: -) 40 – 419 kV -) 420 – 800 kV.		OK
B.6.6	How was the average number of eligible testing items where venting occurred per equipment in the baseline ($NT_{BL,k}$), for category k verified?	/1/	DR	Based on the set of data collected during 2007/15/ and the categorization made according to the voltage level (see B.6.4 above), the average number of eligible testing items where venting occurred per equipment in the baseline, for category 40-419 kV, is: 127 testing done in 46 equipments equals an average of: 2.76 testing per equipment for the 40-419 kV category /35/. For		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				the category 420 – 800 kV, the average is: 19 testing done in 10equipments equals an average of: 1.90 testing per equipment for the 420 – 800 kV category /35/.		
B.6.7	How was the historical amount of SF_6 loss from point j ($L_{SF6,hist,j}$) verified?	/1/	DR	The historical amount of SF_6 purged (loss from point j /45/) was determined based on the historical data /35/ collected between 1 November 2007 and 30 June 2008, and the value found is 0.434 tonnes of SF_6.		OK
B.6.8	How was the sub-index (*j*) used for SF_6 emission points verified?	/1/	DR	The number of emission points (purge) for the project activity is one as shown in the SF_6 process diagram /45/, and verified during DNV's site visit to SFK facilities.		OK
B.6.9	How was the production of SF_6 gas during the historical period ($P_{SF6,hist}$), verified?	/1/	DR	The production of SF_6 gas during the historical period ($P_{SF6,hist}$) has been verified through he historical records obtained during the period 1 November 2007 through to 30 June 2008 /35/, it is equal to 748.6 tonnes of SF_6 gas.		OK
B.6.10	How was the estimated annual emissions resulting from the transport of the cylinders from the SF_6 recovery site to the site of reclamation ($LE_{Trans,est}$), verified?	/1/	DR	This parameter was estimated based on the Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion, from where: a) the distance between the 2 facilities (KERI & SFK) was measured by a GPS unit (104 km) verified during the site visit, b) Number of trips is based on the number of times the cylinder bundles are delivered between the recovery site and the reclamation site from the June 2008 to January 2009(bundles labelled CDM-08001 /34/ through to CDM-08006, and CDM-09001, /35/), 11 trips. c) Standard density of diesel 0,85 kg/l,		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				http://en.wikipedia.org/wiki/Diesel_Fuel d) Vehicle Fuel Consumption (from truck specification), 0.10 litres per km /22/ /35/. e) Emission Factor of diesel 0.07 tCO_2e/GJ, IPCC 2006 /21/ f) Net Calorific Value of Diesel NCV diesel 43.00 GJ/T, IPCC 2006 /21/.		
B.6.11	How was the quantity of fuel type *i* combusted in process *j* during the year *y* ($FC_{i,j,y}$), verified?	/1/	DR	See points: a, b, c, & d in B.6.9 above.		OK
B.6.12	How was the Net Calorific Value of the diesel (NCV_{diesel}), verified?	/1/	DR	The value Net Calorific Value of Diesel, NCV diesel, used in the calculations was: 43.00 GJ/T, taken from IPCC 2006 /21/.		OK
B.6.13	How was the diesel emission factor (EF_{diesel}), verified?	/1/	DR	The value of the Emission Factor of diesel used in the calculations was: 0.07 tCO_2e/GJ, and was taken from IPCC 2006 /21/.		OK
B.6.14	How was the average technical transmission and distribution losses for providing electricity to source *j* year *y* ($TDL_{j,y}$), verified?	/1/	DR	This parameter is determined based on the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /5/, and given that the Scenario A applies for calculating project emission sources (the electricity is purchased from the grid only. Either, no captive power plant is installed at the site of electricity consumption or, if any on-site captive power plant exits, it is not operating or it can physically not provide electricity to the source of electricity consumption), default value of 20% is used.		OK
B.6.15	How was the emissions factor for electricity consumed ($EF_{elec,j,y}$), verified?	/1/	DR	This parameter was determined based on the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /5/, and given that the Scenario A applies for calculating project emission sources (the electricity is purchased from the grid only. Either,		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				no captive power plant is installed at the site of electricity consumption or, if any on-site captive power plant exits, it is not operating or it can physically not provide electricity to the source of electricity consumption). From the Tool, Option A2 is selected, which applies a conservative default value of 1.3 t CO_2e/MWh. The choice of Option A2 is based on the condition that Scenario A applies only to project electricity consumption sources but not to baseline electricity consumption sources.		
B.6.16	How was the rated capacity of the operating equipment used for project activity of the testing facilities at recovery site and reclamation site in year *y* verified?	/1/	DR	The power consumption (capacity) of the operating equipment was obtained directly from the nameplate of the equipment /35/, namely: At recovery site, the following corresponding equipments: 1. Two Compressors – 10kW 2. Suctioning Pump – 0.6 kW 3. Vaccum Pump – 1.5kW 4. Evaporator – 4.8kW Total: 16.9kW = 0.0169MW At reclamation site, the following equipment, 1. One flowmeter – 6 W		OK
Baseline emissions (VVM para 89-93)						
B.6.17	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	The PP has chosen to proceed with the construction of the project in order to create a database of pre-project historical data to build the baseline.	~~CAR2~~ ~~CL22~~ ~~CL23~~ ~~CL24~~ ~~CL25~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.6.18	Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR	The baseline emissions are capped to historic venting as indicated by the methodology. In the determination of "used gas vented during eligible testing item t, tonnes gas" of this process, the PP has used the information from the "Records of gas use" (methodology's preferred method) whenever this information has been available; otherwise the PP has used the second method "Reconstruction based on Manufacturer Specification/ Nameplate or estimated equipment capacity". This is the most conservative approach given the availability of the information.		OK
B.6.19	Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	Although there is no uncertainties left opened under the approved methodology /3/, and the description of PDD /1/ shows full adherence to it, it should be mentioned that, as required by the methodology /3/, a consideration should be given to the uncertainty created by choosing the method 2 (estimation of the amount of gas vented based on default and equipment's name plate values) in the construction of the baseline. However, using the manufacturer's specification/nameplate as the source of estimating the amount of SF_6 capacity of the GIEE, it is reasonable to believe that such estimation is the most accurate (other than measuring the amount of gas flowing out of the equipment, method 1 of the methodology /3/) since the manufacturer self is the one designing the equipment and therefore has all the necessary information to estimate such value. Furthermore, such information (SF_6 requirements with the GIEE) is necessary before the testing/operation of		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			the GIEE, and therefore its availability in the name plate is important in order to ensure the user to have sufficient SF_6 gas to fill the GIEE as per the specifications. Based on the above, such amount can be considered in the worst case as the minimum gas required to meet the equipment performance requirements. Consequently, the use of this method implies a low estimate, and therefore the uncertainty of the SF_6 quantity per equipment is deemed to be rather low.		
Project emissions (VVM para 89-93)					
B.6.20 Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	The PP has followed the calculations of the project emissions as indicated in the methodology, and the data were made available to the DOE during the site visit. However the PP has identified 2 aspects in the methodology for which it is intended to apply for a revision of the methodology to the EB. Although the methodology was based on the proposed methodology NM0251 designed on this project, the PP has identified 2 areas that requires a revision of the methodology, one regarding the decision making flowchart to include the possibility of recovering the gas when a given equipment needs to be disassembled before proceeding to a new testing item, and the other one regards a revision to the equations for $PE_{RCL,y}$ applied under Project Emissions. The method to determine $PE_{RCL,y}$ requires that, "a mass balance of inputs and products should be carried out (this should take into account inter alia: anhydrous hydrogen fluoride (AHF), molten	~~CAR 2~~ ~~CAR 9~~ ~~CAR10~~ ~~CAR11~~ ~~CL 8~~ ~~CL30~~ ~~CL31~~ ~~CL32~~ ~~CL33~~ ~~CL 53~~	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			sulphur, recycled SF_6 and finished products), and any discrepancy shall be proportionately allocated..." as project emissions of SF_6. This method was introduced by the Meth Panel during consideration of NM0251. However, when the PP applied the methodology procedure to the available data (pre-project historical data) the results obtained showed meaningless values. This leads to the conclusion that the method of calculation is fundamentally flawed. It is not appropriate to use a "mass balance" of the entire chemical plant to identify leaks of used gas from the project activity because the calculation method introduces an inordinate amount of noise. The chemical plant produces on the order of 1 000 tonnes of SF_6 per year, alongside other chemical products, whereas the project is expected to recover less than 10 tonnes of SF_6 per year. The historical rate of SF_6 lost from production at the chemical plant is only 0.06% (a proportion of 0.0006). Therefore the equations in the methodology attempt to identify an expected 6 kg of SF_6 lost as a result of the project activity, using a mass balance of production data for over 1,000,000 kg of SF6 (1,000 tonnes). The signal-to- noise ratio is so low that the results are neither representative nor reliable.		
B.6.21 Have conservative assumptions been used when calculating the project emissions?	/1/	DR	The methodology leaves little room for assumptions to be made when estimating project emissions, and already gives conservative indications to calculate project emissions.	~~CAR13 CL51~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				However, the PP shall demonstrate and present evidence that the electricity consumption due to the project activity is negligible and present no material impact to the project emission.		
B.6.22	Are uncertainties in the project emission estimates properly addressed?	/1/	DR	The uncertainties identified regarding the project emissions are: the component of SF_6 gas released to the atmosphere at the reclamation site (purge) originated from the waste SF_6 gas, and the emissions due to the electricity consumption at each of the sites (recovery and reclamation). Regarding the former uncertainty, the PP has followed the approved methodology /3/ to determine the the project emissions due to SF_6 gas released to the atmosphere at the reclamation site. Based on this, only one point where SF_6 gas could be emittted after the injection point. The historical loss rate per unit of SF_6 is calculated in the period of 1 November 2007 - 30 June 2008 due to data availabilty. Since the SF_6 project loss rate (0.069%) /35/ is larger then the historical estimate (0.058%), then the value of the project emissions at the reclamation due release of SF_6 gas estimated as per the approved methodology /3/ are of the order of 382 tCO_2e. Regarding the latter uncertainty, see question B.4.2 above.		OK
Leakage (VVM para 89-93)						
B.6.23	Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	The project leakage derived from the electricity consumption at both sites (recovery and reclamation) are considered by the PP to be small and the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" has not been applied. The PP shall demonstrate	~~CAR12~~ ~~CAR13~~ ~~CL3~~ ~~CL4~~ ~~CL33~~	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			that such electricity consumption is "small".		
B.6.24 Have conservative assumptions been used when calculating the leakage emissions?	/1/	DR	Although the PP has taken a conservative approach in the calculation of leakage emissions, the PP shall ensure that the vehicles used for the transportation of the cylinders comply with the requirements for the classification of "low-greenhouse gas emitting vehicles" as required by the "Emission reductions by low-greenhouse gas emitting vehicles" III.C.	~~CAR14~~	OK
B.6.25 Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR	Yes, the PP has taken into consideration the points addressed in the methodology and corresponding tools. The only uncertainty is the one caused after a contingency (accident, etc.), but in this case the PDD clearly outlines the process for addressing this situations (elaboration of corresponding records and how to correct the PE accordingly).		OK
Emission Reductions (VVM para 89-93)					
B.6.26 Algorithms and/or formulae used to determine emission reductions: • All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced • All documentation is correctly quoted and interpreted. • All values used can be deemed reasonable in the context of the project activity • The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration.	/1/	DR	Yes, the waste SF_6 will not longer be vented but reclaimed (recycled) to the extent that is possible (depending on degree of contamination). The amount of waste SF_6 gas reclaimed is measured by instruments with a reasonable precision according to the type and magnitude of the parameters being measured. The reclaimed gas will then be re-processed to a new gas, which is expected to be commercialized, permanently eliminating the greenhouse effects that would otherwise had caused. In general the PDD has been developed as per the corresponding guidelines and instructions issued by the UNFCCC. However, some corrections	~~CAR 1~~ ~~CAR 2~~ ~~CAR 5~~ ~~CAR 6~~ ~~CAR 7~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				need to be made as indicated in the Table 3 of this report and sections A.1.2 and A.2.4 above, referring to the intended request for revision of the methodology AM0079 version 01 to be submitted to the EB, with regards to the emission reduction calculations and the decision making flowchart. Based on the responses and evidence presented by the PP, DNV has been able to verify that the assumptions, data and calculations required by the approved methodology /3/ and respective tools are properly referenced to and transparently presented by the PP in the PDD /1/ and related documentation, enabling others to replicate the calculations for the emission reductions. The baseline methodology has been applied correctly to calculate the emission reductions, and the information is correctly quoted and interpreted and the values are deemed to be reasonable in the context of project the activity.		
B.7	**Monitoring plan (VVM para 122-124)**					
	Data and parameters monitored					
B.7.1	Do the means of monitoring described in the plan comply with the requirements of the methodology?	/1/	DR	In general the monitoring plan is developed according to the methodology and the CDM guidelines; however some actions still remain to be completed by the PP as indicated in Table 3 (CARs & CLs).	~~CAR14~~ ~~CAR15~~ ~~CAR16~~ ~~CAR17~~ ~~CAR18~~	OK
B.7.2	Does the monitoring plan contains all necessary parameters, and are they clearly described?	/1/	DR	The PP shall prepare specific instructions of the monitoring and archiving procedures and include these into the QA/QC system of each of the companies (namely SFK and KERI).	~~CAR 5~~ ~~CAR 8~~ ~~CAR15~~	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.7.3 In case parameters are measured, is the measurement equipment described? Describe each relevant parameter.	/1/	DR	1. GWP_{SF6} - Global warming potential of SF_6, taken from the IPCC /21/, shall be updated according to any future COP/MOP decisions. 2. $w_{SF6,hist,y}$ - Concentration of SF_6 in used gas in the baseline, to be used as a substitute for $w_{SF6,hist}$ where the record of the concentration of SF_6 in the gas vented in the baseline is not available. Estimated for each project year *y* using the average concentration of SF_6 in the gas recovered in year *y*. The 50% of cylinder bundles *i* that represent the most conservative (contaminated) measurements will be used to the parameter definition. The gas sample will be collected every time a cylinder arrives in SFK plant. This sample will be analyzed in SFK's laboratory using Gas Chromatography tests in accordance with the internal Standard Operational Procedure (SOP) /55/. The detection limit of all the gases analyzed will be at least 50 ppm. 3. $Q_{SF6,k,j,y}$ - Mass of SF_6 that is filled into equipment *j* of category k in year *y* at the SF_6 recovery site. To be measured with a mass flow meter, the quantity of gas filled into each equipment *j* tested under the project activity. 4. $MR_{Gas,i,y}$ - Mass of used gas recovered into	~~CAR16~~ ~~CAR17~~ ~~CAR18~~ ~~CAR23~~	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			cylinder bundle *i* at the SF_6 recovery site in year *y*. To be measured with a mass flow meter, the quantity of gas from the tested equipment going to the recovery cylinder bundle *i* 5. $NT_{PJ,k,y}$ - Average number of total testing items where recovery was done per equipment in the project, for category k. Determined by EcoSecurities and/or SFK once annually, by counting the number of testing items where gas was recovered for the year *y*, by referring to the testing records compiled during the project year at the SF_6 recovery site. Also, counting the number of equipment in each category for the year y, by referring to the testing records compiled during the project year at the SF_6 recovery site. For each category k, make an average of the counts for equipment in that category to derive $NT_{PJ,k,y}$ 6. *i* - Sub-index used for each cylinder bundle that completed a recovery-reclamation cycle included in the estimation of emissions avoided for year *y*. Each recovery cylinder bundle should be clearly identified and labeled so that it can be uniquely identified and associated with gas recovery operations ($MR_{gas,i}$), gas weight ($MS_{gas,i}$), $w_{SF6,i}$, and gas injected		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			($MI_{gas,i}$). 7. *n* - Number of cylinder bundles that completed a recovery-reclamation cycle in the year *y*. Only these cylinder bundles are eligible to be included in the estimation of emissions avoided for the year *y*. Depending on the actual type of operation (recovery, reclamation, and storage of bundles), the appropriate site will keep record of each cylinder bundle *i* for which recovery has been completed, for which reclamation has been completed, and the cylinder bundle *i* identification information. 8. $MS_{Gas,i,y}$ - Mass of used gas stored in recovery cylinder bundle *i* in year *y*. To be measured with a weighing scale, the net weight of cylinder bundle *i* filled with used SF_6 in the recovery site ready to be transported to the reclamation site 9. $w_{SF6,i}$ - Concentration of used SF_6 gas in the cylinder bundle *i*. The proportion must be measured for each cylinder bundle of used gas collected, using a Gas chromatography laboratory test to determine $w_{SF6,i}$ 10. $MI_{Gas,i,y}$ - Mass of used gas from the cylinder bundle *i* injected into the production process for reclamation process in year *y*. To be measured with a		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			mass flow meter measuring the quantity of gas coming from the recovery cylinder bundle *i* to the SF_6 production process (injection). 11. $P_{SF6,i,y}$ - Production of SF_6 gas (measured daily) during the reclamation period of cylinder *i*, in year *y*. The measurement period (measured in days) is the period in which cylinder *i* is connected for gas reclamation. The production measurement will follow the Specific Operational Procedure (SOP) SFK-SOP-SF6-086 /55/, where is defined the detailed procedure, the responsible for measuring it, the reporting system and the equipments (level gauge, pressure, temperature of daily tank) used to measure. 12. $P_{SF6,y}$ - Production of SF_6 gas during the reclamation year *y*, determined from records from regular production monitoring at SF_6 gas reclamation site (sum of $P_{SF6,i,y}$). 13. $L_{SF6,y,i,j}$ - Amount of SF_6 loss from point *j* during the reclamation period of cylinder *i* in year *y*. The measurement period is the period in which cylinder *i* is connected for gas reclamation, as measured in days. This parameter will be measured daily following the Specific Operational Procedure (SOP) SFKSOP-CDM-002		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			/55/, where is defined the detailed procedure for measuring it, the responsible for measuring it, the reporting system and the equipment used to measure. Flow measurements of gas flow from point j using continuous flow measurements, with accuracy of at least 2%. Analysis of samples of the gas flow for SF_6 concentration will be made according using a similar method to the $w_{SF6,i}$. 14. PE_{TFy} - Project emissions as a result of increased electricity consumption at the testing facility attributable to project activity in year *y*. Calculated annually according to the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption", where the electricity consumption is approximated by the rated (nominal) capacity of the operating equipment multiplied by operating hours of the equipment. 15. PE_{RFy} - Project emissions as a result of increased electricity consumption at the reclamation facility attributable to project activity in year *y*. Calculated annually according to the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption", where the electricity consumption is approximated		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			by the rated (nominal) capacity of the operating equipment multiplied by operating hours of the equipment. 16. $EXC_{SF6,y}$ - Quantity of used SF_6 gas which was being injected to the reclamation facility during exceptional events occurred in year *y*. The project proponent must record the date and time of any exceptional event that occurs in year *y* that results in the unusual emission of SF_6. The SF_6 quantity ($EXC_{SF6,y}$) from any reclamation that coincides with the event must be considered as project emissions ($PE_{EXC,y}$). The total amount of gas is to be taken from the continuous measurement of the flow meter on the injection line (mass flow meter, see also point 10 above $MI_{Gas,i,y}$) used to determine $MI_{Gas,i}$		
B.7.4 In case parameters are measured, is the measurement accuracy addressed and deemed appropriate? Describe each relevant parameter.	/1/	DR	1. GWP_{SF6} - Global warming potential of SF_6, taken from the IPCC /21/, with default accuracy. 2. $w_{SF6,hist,y}$ - Concentration of SF_6 in used gas in the baseline, to be used as a substitute for $w_{SF6,hist}$ where the record of the concentration of SF_6 in the gas vented in the baseline is not available. The gas sample will be collected every time a cylinder arrives in SFK plant. This sample will be analyzed in SFK laboratory using Gas Chromatography tests in accordance	~~CAR23~~	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			with the internal Standard Operational Procedure (SOP) /55/. The detection limit of all the gases analysed will be at least 50 ppm. 3. $Q_{SF6,k,j,y}$ - Mass of SF_6 that is filled into equipment *j* of category k in year *y* at the SF_6 recovery site. To be measured with a mass flow meter, with an accuracy of at least 2% 4. $MR_{Gas,i,y}$ - Mass of used gas recovered into cylinder bundle *i* at the SF_6 recovery site in year *y*. To be measured with a mass flow meter, with an accuracy of at least 2% 5. $NT_{PJ,k,y}$ - Average number of total testing items where recovery was done per equipment in the project, for category k. Determined by EcoSecurities and/or SFK once annually, by counting the number of testing items where gas was recovered for the year *y*, by referring to the testing records compiled during the project year at the SF_6 recovery site. Also, counting the number of equipment in each category for the year *y*, by referring to the testing records compiled during the project year at the SF_6 recovery site. For each category k, make an average of the counts for equipment in that category to derive $NT_{PJ,k,y}$ – accuracy consideration not		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			applicable. 6. *i* - Sub-index used for each cylinder bundle that completed a recovery-reclamation cycle included in the estimation of emissions avoided for year *y*. Each recovery cylinder bundle should be clearly identified and labeled so that it can be uniquely identified and associated with gas recovery operations ($MR_{gas,i}$), gas weight ($MS_{gas,i}$), $w_{SF6,i}$, and gas injected ($MI_{gas,i}$) – accuracy consideration not applicable. 7. *n* - Number of cylinder bundles that completed a recovery-reclamation cycle in the year *y*. Only these cylinder bundles are eligible to be included in the estimation of emissions avoided for the year *y*. Depending on the actual type of operation (recovery, reclamation, and storage of bundles), the appropriate site will keep record of each cylinder bundle *i* for which recovery has been completed, for which reclamation has been completed, and the cylinder bundle *i* identification information – accuracy consideration not applicable. 8. $MS_{Gas,i,y}$ - Mass of used gas stored in recovery cylinder bundle *i* in year *y*. To be measured with a weighting scale with an accuracy of at least 1 kg.		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			9. $w_{SF6,I}$ - Concentration of used SF_6 gas in the cylinder bundle *i*. The proportion must be measured for each cylinder bundle of used gas collected, using a Gas chromatography laboratory test to determine $w_{SF6,i}$. Measurement to be made according to the internal Standard Operational Procedure (SOP) /55/, which is based on national and/or international standards, with a recommended detection limits of at least 50 ppm. 10. $MI_{Gas,i,y}$ - Mass of used gas from the cylinder bundle *i* injected into the production process for reclamation process in year *y*. To be measured with a mass flow meter, with an accuracy of at least 2%. 11. $P_{SF6,i,y}$ - Production of SF_6 gas during the reclamation period of cylinder *i*, in year *y*. The measurement of this variable is result of three monitored inputs: levelling, pressure and temperature. The accuracy of each monitoring equipment will be at least : • Level gauge : ±50 mm • Pressure gauge : ± 0.5 % • Temperature : ± 0.5 % 12. $P_{SF6,y}$ - Production of SF_6 gas during the reclamation year *y*, determined from records from regular production		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			monitoring at SF_6 gas reclamation site – accuracy consideration not applicable. 13. $L_{SF6,y,i,j}$ - Amount of SF_6 loss from point *j* during the reclamation period of cylinder *i* in year *y*. The measurement period is the period in which cylinder *i* is connected for gas reclamation, as measured in days. SF6 Concentration Measurement to be made according to ASTM 2472-00 or other applicable national or international standards. The measurement of mass flow will have an accuracy of at least 2% 14. PE_{TFy} - Project emissions as a result of increased electricity consumption at the testing facility attributable to project activity in year *y*. Calculated annually according to the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption", where the electricity consumption is approximated by the rated (nominal) capacity of the operating equipment multiplied by operating hours of the equipment – accuracy consideration not applicable. 15. PE_{RFy} - Project emissions as a result of increased electricity consumption at the reclamation facility attributable to project activity in year *y*. Calculated annually according to the "Tool to calculate baseline, project and/or leakage emissions		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			from electricity consumption", where the electricity consumption is approximated by the rated (nominal) capacity of the operating equipment multiplied by operating hours of the equipment – accuracy consideration not applicable. 16. $EXC_{SF6,y}$ - Quantity of used SF_6 gas which was being injected to the reclamation facility during exceptional events occurred in year *y*. The project proponent must record the date and time of any exceptional event that occurs in year *y* that results in the unusual emission of SF_6. The SF_6 quantity ($EXC_{SF6,y}$) from any reclamation that coincides with the event must be considered as project emissions ($PE_{EXC,y}$). The total amount of gas is to be taken from the continuous measurement of the flow meter on the injection line (mass flow meter, see also point 10 above $MI_{Gas,i,y}$) used to determine $MI_{Gas,i}$, flow meter accuracy as per point 10 above $MI_{Gas,i,y}$		
B.7.5 In case parameters are measured, are the requirements for maintenance and calibration of measurement equipment described and deemed appropriate? Describe each relevant parameter.	/1/	DR	1. GWP_{SF6} - Global warming potential of SF_6, taken from the IPCC /21/, - maintenance and calibration not applicable, other than applying updates made by the IPCC /21/. 2. $w_{SF6,hist,y}$ - Concentration of SF_6 in used gas in the baseline, to be used as a	~~CAR5~~ ~~CAR23~~	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			substitute for $w_{SF6,hist}$ where the record of the concentration of SF_6 in the gas vented in the baseline is not available. - The chromatographers are frequently self calibrated using standard gases manufactured by authorized companies. By analyzing of standard gas, it is possible to check analyzer if show same (or slightly different) results. In addition, a self-calibration with standard gas is performed annually by a specialist to measure the detection limit of the equipment. 3. $Q_{SF6,k,j,y}$ - Mass of SF_6 that is filled into equipment *j* of category *k* in year *y* at the SF_6 recovery site. To be measured with a flow meter, with a calibration frequency of every 2 years. The equipment will be checked and maintained according the Standard Operational Procedure (SOP) /55/. 4. $MR_{Gas,i,y}$ - Mass of used gas recovered into cylinder bundle *i* at the SF_6 recovery site in year *y*. To be measured with a flow meter, with a calibration frequency of every 2 years. The equipment will be checked and maintained according the Standard Operational Procedure (SOP) /55/. 5. $NT_{PJ,k,y}$ - Average number of total testing		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			items where recovery was done per equipment in the project, for category k. Determined by EcoSecurities and/or SFK once annually, by counting the number of testing items where gas was recovered for the year *y*, by referring to the testing records compiled during the project year at the SF_6 recovery site. Also, counting the number of equipment in each category for the year y, by referring to the testing records compiled during the project year at the SF_6 recovery site. For each category k, make an average of the counts for equipment in that category to derive $NT_{PJ,k,y}$, - maintenance and calibration not applicable 6. *i* - Sub-index used for each cylinder bundle that completed a recovery-reclamation cycle included in the estimation of emissions avoided for year *y*. Each recovery cylinder bundle should be clearly identified and labeled so that it can be uniquely identified and associated with gas recovery operations ($MR_{gas,i}$), gas weight ($MS_{gas,i}$), $w_{SF6,i}$, and gas injected ($MI_{gas,i}$) - maintenance and calibration considerations are not applicable. 7. *n* - Number of cylinder bundles that completed a recovery-reclamation cycle in the year *y*. Only these cylinder bundles		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			are eligible to be included in the estimation of emissions avoided for the year *y*. Depending on the actual type of operation (recovery, reclamation, and storage of bundles), the appropriate site will keep record of each cylinder bundle *i* for which recovery has been completed, for which reclamation has been completed, and the cylinder bundle *i* identification information, - maintenance and calibration not applicable 8. $MS_{Gas,i,y}$ - Mass of used gas stored in recovery cylinder bundle *i* in year *y*. To be measured with a weighting scale, with a calibration frequency of every 2 years. Equipment will be checked according to the Standard Operational Procedure (SOP) /55/. 9. $w_{SF6,i}$ - Concentration of used SF_6 gas in the cylinder bundle *i*. The proportion must be measured for each cylinder bundle of used gas collected, using a Gas chromatography laboratory test to determine $w_{SF6,i}$- The chromatographers are frequently self calibrated using standard gases manufactured by authorized companies. By analyzing of standard gas, it is possible to check analyzer if show same (or slightly different) results. In addition, a self-		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			calibration with standard gas is performed annually by a specialist to measure the detection limit of the equipment. 10. $MI_{Gas,i,y}$ - Mass of used gas from the cylinder bundle *i* injected into the production process for reclamation process in year *y*. To be measured with a flow meter, with a calibration frequency of every 2 years. The equipment will be checked and maintained according the Standard Operational Procedure (SOP) /55/ 11. $P_{SF6,i,y}$ - Production of SF_6 gas during the reclamation period of cylinder *i*, in year *y*. To be measured with each instrument (leveling, pressure and temperature see B.7.4 above), whose calibration will be done every 2 years. The equipment will be checked and maintained according the Standard Operational Procedure (SOP) /55/. 12. $P_{SF6,y}$ - Production of SF_6 gas during the reclamation year *y*, determined from records from regular production monitoring at SF_6 gas reclamation site, - maintenance and calibration considerations are not applicable. 13. $L_{SF6,y,i,j}$ - Amount of SF_6 loss from point *j* during the reclamation period of cylinder *i* in year *y*. The measurement period is the		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			period in which cylinder *i* is connected for gas reclamation, as measured in days. To be measured with a mass flow-meter, with a calibration frequency of every 2 years. The equipment will be checked and maintained according the Standard Operational Procedure (SOP) /55/. 14. PE_{TFy} - Project emissions as a result of increased electricity consumption at the testing facility attributable to project activity in year *y*. Calculated annually according to the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption", where the electricity consumption is approximated by the rated (nominal) capacity of the operating equipment multiplied by operating hours of the equipment, - maintenance and calibration considerations are not applicable. 15. PE_{RFy} - Project emissions as a result of increased electricity consumption at the reclamation facility attributable to project activity in year *y*. Calculated annually according to the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption", where the electricity consumption is approximated by the rated (nominal) capacity of the operating equipment multiplied by		

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				operating hours of the equipment, - maintenance and calibration considerations are not applicable. 16. $EXC_{SF6,y}$ - Quantity of used SF_6 gas which was being injected to the reclamation facility during exceptional events occurred in year *y*. The project proponent must record the date and time of any exceptional event that occurs in year *y* that results in the unusual emission of SF_6. The SF_6 quantity ($EXC_{SF6,y}$) from any reclamation that coincides with the event must be considered as project emissions ($PE_{EXC,y}$). The total amount of gas is to be taken from the continuous measurement of the flow meter on the injection line (mass flow meter, see also point 10 above $MI_{Gas,i,y}$) used to determine $MI_{Gas,i}$, flow meter maintenance and calibration as per point 10 above $MI_{Gas,i,y}$		
B.7.6	Is the monitoring frequency adequate for all monitoring parameters? Describe each parameter.	/1/	DR	1. GWP_{SF6} - Global warming potential of SF_6, taken from the IPCC /21/, shall be updated according to any future COP/MOP decisions, which is an adequate frequency for this parameter in order to cover all the variations resulting in an impact to the project activity. 2. $w_{SF6,hist,y}$ - Concentration of SF_6 in used gas in the baseline, to be used as a substitute for $w_{SF6,hist}$ where the record of	~~CAR23~~	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			the concentration of SF_6 in the gas vented in the baseline is not available. To be measured with a frequency of: each cylinder bundle *i* with used SF_6 gas recovered under the project activity, which is an adequate frequency for this parameter in order to cover all the variations resulting in an impact to the project activity. 3. $Q_{SF6,k,j,y}$ - Mass of SF_6 that is filled into equipment *j* of category k in year *y* at the SF_6 recovery site. To be measured (frequency) on each GIEE equipment *j* tested under the project activity, which is an adequate frequency for this parameter in order to cover all the variations resulting in an impact to the project activity. 4. $MR_{Gas,i,y}$ - Mass of used gas recovered into cylinder bundle *i* at the SF_6 recovery site in year *y*. To be measured with a frequency of: each cylinder bundle *i* filled with used SF_6 gas recovered from each GIEE equipment *j* tested under the project activity, which is an adequate frequency for this parameter in order to cover all the variations resulting in an impact to the project activity. 5. $NT_{PJ,k,y}$ - Average number of total testing items where recovery was done per		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			equipment in the project, for category k. To be measured with a frequency of: determined by EcoSecurities and/or SFK once annually, which is an adequate frequency for this parameter in order to cover all the variations resulting in an impact to the project activity. 6. *i* - Sub-index used for each cylinder bundle that completed a recovery-reclamation cycle included in the estimation of emissions avoided for year *y*. To be measured with the following frequency: When an empty cylinder bundle arrives at KERI site, a new label number is created as CDM-YYXXX(YY : year, XXX sequent number) and gross weight of cylinder bundle is measured. With these information, one label having starting date, label number (lot no), bundle no, gross weight, etc is created. The Label number is a reference number that will be used during all the reclamation cycle. This is an adequate frequency for this parameter in order to cover all the variations resulting in an impact to the project activity. 7. *n* - Number of cylinder bundles that completed a recovery-reclamation cycle in the year *y*. Only these cylinder bundles are eligible to be included in the		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			estimation of emissions avoided for the year *y*. To be measured with a frequency of: the appropriate site will keep record of each cylinder bundle *i* for which recovery has been completed, which is an adequate frequency for this parameter in order to cover all the variations resulting in an impact to the project activity. 8. $MS_{Gas,i,y}$ - Mass of used gas stored in recovery cylinder bundle *i* in year *y*. To be measured with a frequency of: each cylinder bundle *i* filled with used SF_6 gas recovered at the recovery site (KERI site) and prior to be transported to the reclamation site (SFK site) , which is an adequate frequency for this parameter in order to cover all the variations resulting in an impact to the project activity. 9. $w_{SF6,i}$ - Concentration of used SF_6 gas in the cylinder bundle *i*. To be measured with a frequency of: for each cylinder bundle *i* filled with used SF_6 gas using a laboratory test (gas chromatography), and prior to its injection into the production line of new SF_6 gas at reclamation site (SFK site) , which is an adequate frequency for this parameter in order to cover all the variations resulting in an impact to the project activity. 10. $MI_{Gas,i,y}$ - Mass of used gas from the		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			cylinder bundle *i* injected into the production process for reclamation process in year *y*. To be measured with a frequency of: each cylinder bundle *i* with used SF_6 gas recovered under the project activity and when is injected into the production line of new SF_6 at the reclamation facility, which is an adequate frequency for this parameter in order to cover all the variations resulting in an impact to the project activity. 11. $P_{SF6,i,y}$ - Production of SF_6 gas during the reclamation period of cylinder *i*, in year *y*. The measurement frequency will be as follows: each cylinder bundle i filled with used SF6 gas recovered from each GIEE equipment j tested under the project activity, based on daily records. This is an adequate frequency for this parameter in order to cover all the variations resulting in an impact to the project activity. 12. $P_{SF6,y}$ - Production of SF_6 gas during the reclamation year *y*, determined from records from regular production monitoring at SF_6 gas reclamation site. To be measured with an annual, and this is an adequate frequency for this parameter in order to cover all the variations resulting in an impact to the project activity. 13. $L_{SF6,y,i,j}$ - Amount of SF_6 loss from point *j*		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			during the reclamation period of cylinder *i* in year *y*. To be measured with a frequency of: continuous measurement of gas flow from point *j*, which is an adequate frequency for this parameter in order to cover all the variations resulting in an impact to the project activity. 14. PE_{TFy} - Project emissions as a result of increased electricity consumption at the testing facility attributable to project activity in year *y*. To be measured with a frequency of: calculated annually, which is an adequate frequency for this parameter in order to cover all the variations resulting in an impact to the project activity. 15. PE_{RFy} - Project emissions as a result of increased electricity consumption at the reclamation facility attributable to project activity in year *y*. To be measured with a frequency of: calculated annually, which is an adequate frequency for this parameter in order to cover all the variations resulting in an impact to the project activity. 16. $EXC_{SF6,y}$ - Quantity of used SF_6 gas which was being injected to the reclamation facility during exceptional events occurred in year *y*. To be measured with a frequency of: the continuous		

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				measurement of the flow meter on the injection line used to determine $MI_{Gas,i}$. The PP must record the date and time of any exceptional event that occurs in year *y* that results in the unusual emission of SF_6, both of which (continuous measurement and time &date) are at an adequate frequency for these parameters in order to cover all the variations resulting in an impact to the project activity.		
B.7.7	Is the recording frequency adequate for all monitoring parameters? Describe each parameter.	/1/	DR	See B.7.6 above	~~CAR23~~	OK
	Ability of project participants to implement monitoring plan					
B.7.8	How has it been assessed that the monitoring arrangements described in the monitoring plan are feasible within the project design?	/1/	DR	Based on the site visit and the review of the PDD and related documentation received, DNV has been able to validate that the monitoring plan is properly planned from the perspective of enabling verification at a later stage, with the exception of few issues listed in table 3 of this report.	~~CAR 2~~ ~~CAR 3~~ ~~CAR 4~~ ~~CAR 5~~ ~~CAR15~~ ~~CAR16~~ ~~CAR19~~	OK
B.7.9	Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?	/1/	DR	The PP shall present the QA/QC, administrative and training manuals and procedures for review. Furthermore, the PP shall design one whole responsible for the collection and archiving of CDM data both at the recovery (KERI) and reclamation sites (SFK),	~~CAR5~~ ~~CAR8~~ ~~CAR19~~	OK
B.7.10	Are the data management and quality assurance and quality	/1/	DR	The PP shall present the QA/QC, administrative	~~CAR5~~	OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	control procedures sufficient to ensure that the emission reductions achieved by/resulting from the project can be reported ex post and verified?			and training manuals and procedures for review. Furthermore, the PP shall designate one person to be fully responsible for the collection and archiving of CDM data both at the recovery (KERI) and reclamation sites (SFK),	~~CAR14~~ ~~CAR15~~ ~~CAR19~~	
B.7.11	Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/1/	DR	Yes. All relevant data will be archived electronically, and backed up regularly as per the PDD and internal IT procedures of SFK. SFK will also be responsible for the proper archiving and archiving procedures of the project activity information originated at KERI's facilities.	~~CAR19~~	OK
	Monitoring of sustainable development indicators/ environmental impacts					
B.7.12	Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR	The PP shall submit the letter of approval issued by each of the respective DNA's.	~~CAR1~~	OK
B.7.13	Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR	Due to the nature of the project there is only environmental and economic factors involved in the project activity, and these limited to the actual issues that are the focus of the project activities. As such, there is need for improvement of the archiving routines in particular with the information originated at the recovery site.	~~CAR19~~	OK
B.7.14	Are the sustainable development indicators in line with stated national priorities in the host country?	/1/	DR	The PP shall submit the letter of approval issued by each of the respective DNA's.	~~CAR1~~	OK
C	**Duration of the project activity / crediting period**					
C.1.1	**Start date of project activity (VVM para 99-100, 104)**					
C.1.2	How has the starting date of the project activity been determined? What are the dates of the first contracts for the	/1/	DR	The PP shall revise the start date of the project (PDD version 01 section C.1.1 Page 47) as per	~~CL 6~~ ~~CL 7~~	OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	project activity? When was the first construction activity?			the "Guidance on the Demonstration and Assessment of Prior consideration of the CDM" (/8/) (when the real action took place – commercial commitment). The PP shall demonstrate how the 20 years lifetime of the project was estimated, as well as the corresponding evidence.	~~CL 19~~ ~~CL 34~~ ~~CL 35~~ ~~CL52~~	
C.1.3	Is the stated expected operational lifetime of the project activity reasonable?	/1/	DR	See C.1.2 above	~~CL19~~ ~~CL52~~	OK
C.1.4	Is the start date, the type (renewable/fixed) and the length of the crediting period clearly defined and reasonable?	/1/	DR	The first year of crediting period is expected to 2010. This seems reasonable given the remaining steps of the project before an eventual registration by the EB. It should be noted that the start date of the crediting period was revised (postponed) during the validation process. The crediting period it is now expected to start in 2011.		OK
D Environmental Impacts (VVM para 131-133)						
D.1.1	Are there any host country requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved? Does the approval contain any conditions that need monitoring?	/1/	DR	Given that the project activities are confined within the compounds of the corresponding sites (except for the transportation of the cylinders activity), the environmental impacts are related to the actual project emissions, which overall will be positive due to the reduction of emissions. The installation of the equipment required by the project activities poses no threat to the environment and will be done within the existing installations at each of the project sites. Both companies SFK and KERI are authorized to operate within their business activities /13/ /14/	~~CAR1~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				/44/ /66/ /72/, and as such have fulfilled/obtained the necessary requirements/permits (Permit for emissions of Air Pollutants, Permit for non-point waste water Pollutants, and Permit for toxic chemical usage, manufacture and sale) in order to operate within their activities. Since the project activities are only a minor variation to their main activities respectively, the former are therefore also covered within the environmental, legal, operational, and business permits held by each of the companies. However it is still required that the PP present the LoA form the host country to demonstrate further the compliance with the environmental requirements of the host country.		
D.1.2	Does the project comply with environmental legislation in the host country?	/1/	DR	See D.1.1 above		OK
D.1.3	Will the project create any adverse environmental effects?	/1/	DR	Other than the emissions due to the transportation of the cylinders, there is no other adverse environmental effect. resulting from the project activity		OK
D.1.4	Have identified environmental impacts been addressed in the project design?	/1/	DR	Yes.		OK
D.1.5	Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/	DR	The project activity is a minor variation of the business activity for which each company, SFK and KERI, are already authorized to operate within, and therefore it is covered by the same permits already issued to each of the companies – See D.1.1 above.		OK
D.1.6	Are transboundary environmental impacts considered in the analysis?	/1/	DR	There is none transboundary environmental impacts created by the project activity.		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
E Stakeholder Comments (VVM para 128-130)						
E.1.1	Have relevant stakeholders been consulted?	/1/	DR	Yes. The PP has held meetings with the DNA from the host country and local stakeholders. The project PDD was posted for global public consultation on the UNFCCC website. Also the DOE held interviews with some employees during the site visit.		OK
E.1.2	Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	Yes. The local meeting was announced via a local newspaper, an internet newspaper and in KERI's website.		OK
E.1.3	If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/	DR	The PP shall present the letter of approval form the Host country DNA sowing that it has compliance with regulations related to consultation process.	~~CAR1~~	OK
E.1.4	Is a summary of the stakeholder comments received provided?	/1/	DR	Yes, in section E.2 of the PDD is the summary of the comments received. In the reference 3-1 of annex 6 of PDD it is presented the complete stakeholder consultation process followed by the PP. There was not comments received form the global public consultation.		OK
E.1.5	Has due account been taken of any stakeholder comments received?	/1/	DR	Yes, in sections E.2 and E.3 of the PDD it is presented a summary of the comments received and answers given during local consultation meeting. However these were mainly of an informative nature and did not have any direct impact on the design of the project activity		OK

Table 3 Resolution of corrective action requests and clarification requests

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
CAR 1 The PP shall present the approval letters from the DNAs of both Parties involved	A.3.2 A.3.3 B.4.6 B.7.12 B.7.14 E.1.3 D.1.1	LOAs from both Korean DNA and Annex 1 have been presented to DNV.	The two LOAs have been provided by PP. CAR closed.
CAR 2 The PDD version 01 deviates from the methodology in the calculation of the project emission reduction's calculations. In this respect the PP will request a revision of the methodology to address this issue.	B.1.1 B.3.1 B.4.4 B.6.17 B.6.20	The PDD version 2 has been revised to apply AM0079 version 2; the project emission calculation has been revised to follow the applied methodology. The methodology requires that "Project participants shall identify all plausible point in the production line of SF_6, after the point of injection of used SF_6, where SF_6 gas is emitted." One purge gas outlet was identified (see "8.15 SF6 process including purge point with arrow")	DNV can confirm that the project participant has requested a revision of the methodology AM0079 version 01. The EB has replied to the request with a new version of the methodology, namely AM0079 version 02. The project participant has revised the PDD according to the new version 02 of the methodology AM0079. DNV has been able to verify that the schematic diagram of the used SF_6 gas reclamation process shows that the purge gas outlet is located at the injection point of the used SF_6 gas. CAR closed
CAR 3 The labelling procedure for the bundle (cylinders) after reclamation completed and to be delivered to KERI empty for new recovery session shall be improved	A.2.6	In document number: SFKSP61(Rev.00)_CDM_Project _Management on page 3 the 6th paragraph named "6 Storage Containers" describes the new labelling procedure. In summary, after	By removing the old label it will be eliminated the risk of using the same label for identifying 2 different shipments of used gas.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		reclamation, worker puts a new label having the information of end date of reclamation on cylinder bundle and removes old label which was placed at the KERI site.	CAR closed
CAR 4 Test record (which is the baseline document) should be updated. e.g. prepare a table linking receipt number with raw data sheet, tests database documentation, the summary datasheet of the reconstructed baseline.	A.2.6	Baseline records and complete documentation are updated in database '8_Baseline2007_AFTER Val Aug09' was provided to the DOE. The documentation is presented per test, so each test has its own folder which contains the following documentation: 1. Application for Test ("Application") 2. Determination of number of phases ("No-Load") 3. Raw datasheet ("Raw data") 4. Test report (certificate and / or extended report) ("Report", "Report_Extended") 5. Nameplate (if applicable) ("Nameplate") All file name structure is 'A-B' where 'A' is the 'test receipt number' and 'B' is 'test number'. The first two characters in 'B' were omitted, since they are common to all tests ('10'). Summary datasheet has been updated as per 'SF6_CER Cal_V3.0_111109'. The baseline reconstruction has been	DNV has been able to verify that the summary of the baseline reconstruction in the revised PDD (Annex 3, Table 3.1) corresponds to the information in the database provided by the Project proponent 8_Baseline2007_AFTER Val Aug09. However the amount of SF_6 gas indicated in the table seems to include 3 kg of additional of SF_6 gas for each test perform than the value indicated in the database records. The project proponent shall clarify how such value is estimated and why it is added to the amount of gas used in the equipment. CAR 4 Continued

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		revised due to the application of AM0079 version 2; namely, only two circumstances are considered eligible for considering historic venting in the baseline, following the Default decision-making flowchart: (1) the last testing item of the test, and (2) where the testing item was repeated and the equipment was dismantled. Whereas, previously three circumstances were considered to lead to eligible venting: the two listed above, plus (3) where between one testing item and the next, the equipment was dismantled.	
CAR 4 continued The amount of SF_6 gas indicated in the table seems to include 3 kg of additional of SF_6 gas for each test perform than the value indicated in the database records. The project proponent shall clarify how such value is estimated and why it is added to the amount of gas used in the equipment.		The SF_6 capacity of each equipment is calculated by taking into account the equipment type (dead or live), relevant equipment compartments (see AM0079 v. 2 Table B.1), and configuration (number of phases). (1) Live type equipment does not have bushings. SF_6 capacity calculation for Live type equipment only considers the SF_6 capacity of the relevant compartment (e.g. Circuit Breaker, "CB"). (2) Dead type equipment has bushings, therefore the SF_6 capacity calculation for Dead type equipment (where nameplates are used for SF_6 amount of main compartment(s)), considers both: the SF_6 capacity of the relevant compartment (CB,	The response given by the PP, presents an explanation of the calculation of the amount of SF_6 gas required for a given equipment as a function of: • the type of equipment (Live or Dead type equipment), • the equipment compartments, and, • the number of phases. See file "response to CAR4 CL5.pdf" /46/. Such explanation, in conjunction with the response presented herein, suffices the issue raised by DNV. CAR closed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		DS or ES) and the bushings. (3) The SF_6 capacity is per phase therefore shall multiplied by the number of phases to determine the total capacity of the equipment.	
CAR 5 PP shall present the following operational and administrative documents for revision: 1- QA / QC manuals 2- Training procedures – to be included within current framework used at site (e.g. ISO system) 3- Updated organizational structure with one more level of detail than the one presented during the site visit– including the roles and functions of the people responsible. 4- Calibration procedures and scheduling 5- Maintenance procedures for the all the equipment including the valves. 6- Procedures for injection of gas and record keeping by non KERI staff 7- Procedures for purge gas emissions: 7.a Data storage procedures 7.b Management procedures 8- Procedures for dealing with contingencies and erroneous measurements.	A.2.6 B.7.5 B.7.10	1 – The full procedures including QA/QC procedures are provided (see contents of "Monitoring & Procedures References" folder) 2 – The document: SFKSP61(Rev.00)_CDM_Project_Management page 3, 9th paragraph named "9 Education and Training", describes the training procedures. 3 - See document "1_01 SF6 project_CDM Monitoring Guidance_AM0079_v01-v07" 4 – Described in the SOPs. Summarized in document "1_01 SF6 project_CDM Monitoring Guidance_AM0079_v01-v07" 5 – Organization of maintenance described in KERI's and SFK's SOP documents 6 – Included in KERI-SOP-CDM-002_Rev.01 7 – Included in SFK-SOP-CDM-002_Rev.01 8 – Included in SFK-SOP-CDM-003_Rev.00	1- The PP has presented copies of the QA/QC used at both of the facilities (KERI-recovery and SFK-reclamation). These are prepared according to current business practice. 2- The reference document presented by the PP describes the training procedures. 3- The organizational structure is properly represented in the document provided. 4- The calibration procedures and frequency are described in the reference document (SF_6 Project CDM monitoring guidance). 5- The set of documents presented (re. point 1 above in this CAR) reflect the maintenance procedure for the equipment involved including the valves. 6- The procedures for recovery of the SF_6 at KERI's facilities are described in the reference document. 7- The procedures for purge gas emissions are presented in the reference document. 8- The back up plan for dealing with contingencies is described in the reference document.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			CAR closed
CAR 6 Further investigation of the common practice in KERI shall be undertaken. - The geographical area shall be extended outside Korea and the selection of the region assessed shall be justified. - Obtain evidence of the common practice regarding SF_6 - Why is the PP identifying KERI different to these plants?	A.4.1 B.4.4 B.4.7 B.5.1 B.5.42 B.5.45 B.5.46 B.5.48	The common practice investigation was revised to consider and justify the geographical area, describe relevant common practice regarding SF_6 and explain why KERI is identified different then the other facilities. See revised PDD version 2 and also reference 8.17 LS Industrial Systems PTTI.	Based on the evidence provided, DNV was able to confirm that the geographical area of South Korea, Japan and Taiwan, is suitable for the conditions of the project, given that all the equipment tested at KERI during 2007 (relevant year for determining the baseline) came from these locations. Within this area, testing facilities in Japan are excluded since Japan is an Annex 1 country with a different regulatory framework (not a comparable environment), and other existing testing facilities within Taiwan (www.tertec.org.tw/_english/index.htm) and Korea (http://eng.lsis.biz/rnd/rnd_02.asp) do not provide high power testing services where the contamination of SF_6 gases are likely to occur. Therefore, from the CDM perspective KERI has unique conditions within the geographical area. CAR closed
CAR 7 Please provide 3 letters from KERI's customers confirming baseline practices regarding venting of the used SF_6, as a (additional) proof of common practice.	B.4.4 B.4.7 B.5.1 B.5.42	Letters from three of KERI's main clients, who confirm that venting was the common practice at KERI, are presented: '8.10a_VentConfirm(HyundaiHeavyInd	During the site visit, KERI personnel confirmed that the equipment owner was the one in charge to vent (release) the contaminated gas from their own equipment after testing. Based on this

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
	B.5.44 B.5.45 B.5.46 B.5.48	ustries)' '8.10b_VentConfirm(Hyosung)' '8.10c_VentConfirm(LS Industrial Systems)'	the PP gather the letters of 3 of customers from KERI confirming that this was the common practice until the installation of the recovery system by the PP. CAR closed.
CAR 8 The PP shall include a training section for KERI's personnel on how to guide the customer's personnel to ensure compliance with the requirements of the project activity.	B.7.9	Included in KERI-SOP-CDM-002_Rev.01	The reference document indicates the procedures for recovery of the used SF_6 gas. The participation of KERI's customers will be limited to connecting the hose to their own equipment and allowing the flow of the used SF_6 gas into the hose upon the go ahead signal of KERI's personnel. CAR closed.
CAR 9 PDD version 01 - Page 14. Indication of project emission shall be revised/updated.	A.2.4 B.1.1 B.6.20	The PDD has been revised to apply AM0079 version 2; treatment of project emissions has been revised to follow the applied methodology.	The PDD has been corrected to properly reflect the conditions required by the approved methodology AM0079 version 02. CAR closed
CAR 10 PDD version 01 – Page 8. The average reclamation capacity is estimated as around 3 kg/h of used SF_6, depending on the contamination levels of the gas. Present the reasoning and calculations of the estimated "3kg/h".	B.6.20	Any reference in maximum injection capacity of 23.8 tonnes or average reclamation capacity is taken out as it is misleading. On page 8, we have removed the phrase, 'The average reclamation capacity is estimated as around 3 kg/h of used SF_6, depending on the contamination levels of the gas.	PDD has been amended as per the response of the PP. Furthermore, the reference document shows (as stated in the response of the PP) that the average reclamation rate between 9th July, 2008 and 26th February, 2009, is 4.299 kg/h. CAR closed

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		Assuming 7,920h/year of operation that would be a reclamation potential of around 23.8 tonnes of used SF_6 per year," and replaced it with the text, "It is expected that the average amount of SF_6 reclaimed will be around 9.7 tonnes of used SF_6 per year." Updated in PDD v2. The reclamation rate of 3 kg/h was expected based upon previous experience at the German facility; however, the observed rate at the project facility has been about 4.3 kg/hr (See: 8.16 07.08-02.09 Used SF_6 Reclamation rate)	
CAR 11 Regarding annual recovery of SF_6. PDD version 01 - Page 20. "This is currently estimated at 9.7 tonnes per year only based on the recovery records for the period July 2008 to March 2009". Based on site visit information this is what is realistically expected. Page 8: "reclamation potential of around 23.8 tonnes of used SF_6 per year". This is the maximum potential. The correct value is the 9.7, the phrase in page 8 shall be re-written.	B.6.20	Updated in PDD v2. Any reference in maximum injection capacity of 23.8 tonnes is taken out as it is misleading. Page 8 has been rephrased as '*It is expected that the average amount of SF_6 reclaimed will be around 9.7 tonnes of used SF_6 per year*'.	The PDD version 3 reflects the changes indicated by the PP. CAR closed.
CAR 12 PDD version 01 - Page 37. Vehicle Fuel consumption (weight) 0.24 ?? (0.5 L/Km X	B.6.23	Vehicle fuel consumption (weight) corrected to 0.085 kg/km, by multiplying vehicle fuel consumption in	The PDD version 3 reflects the changes indicated by the PP, and the fuel consumption is further justified by the

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
0.85 KG/L = 0.425 KG/Km. PDD shall be corrected and updated accordingly		volume units by standard diesel fuel density, giving 0.1 l/km * 0.85 kg/l = 0.085 kg/km (see CL 4 below for diesel density). Vehicle fuel consumption (weight) is 10.1 km/l according to entry 22 in the truck specification of the vehicles used for transport of the cylinder bundles, refer to "8.5 SFK Vehicle petrol consumption".	reference document. CAR closed.
CAR 13 The PP shall present evidence that the electricity consumption at each of the project sites (recovery and reclamation) is low enough to be considered negligible or no material to the project emissions. The PP shall demonstrate that such electricity consumption is "small" by providing the nominal power of each and all of the electrical equipment within the project activity, as well as its corresponding operating time (the later shall be referred to the pre-project historical data to the extent that is possible). Based on this information the DOE will ratify the PP's chosen approach, or, request for the application of the tool as indicated in the methodology.	B.6.23	The PDD has been revised to follow the methodology, which requires the Tool to be applied, but allows $EC_{PJ,j,y}$ [Quantity of electricity consumed by the project electricity consumption source *j* in year *y* (MWh/yr)] to be approximated as the rated capacity of the operating equipment multiplied by operating hours of the facility	The electricity consumption by the project activity has been determined by the capacity of the electrical equipment involved, resulting in a total of 0.0169 MW for the recovery site and $6x10^{-6}$ MW for the reclamation site. CAR closed.
CAR 14 The PP shall produce and maintain records specifying the type of vehicle used for	B.6.24 B.7.10	PDD revised to apply the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".	The PDD reflects the changes indicated by the PP.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
transportation of the cylinders. Such a vehicles have to be of the type "lowgreenhouse gas emitting vehicles" as required by the "Emission reductions by lowgreenhouse gas emitting vehicles" III.C.		See PDD version 2.	CAR closed.
CAR 15 Procedures at recovery site should include the stage of filling of gas to the equipment	B.7.10	Included in KERI-SOP-CDM-002_Rev.01	The reference document presents the procedures and schematics for transferring the SF_6 used gas from the tested electrical equipment to the project activity equipment (filling of the project activity equipment). The filling of the electrical equipment is made by the owner/manufacturer of such equipment and depend according to the individual design and specifications of the electrical equipment in question, which is out of the scope of the project activity. CAR closed.
CAR 16 PP shall present the equipment specification and calibration records of each and all the equipment related to the project.	B.7.3	See document "1_01 SF6 project CDM Monitoring Guidance_AM0079_v01-v07"	The reference document presents the equipment specifications, as well as their calibration frequency and corresponding history. CAR closed.
CAR 17 PDD - Description of how/who/where the NT number is calculated needs to be improved	B.7.3	$NT_{PJ,k,y}$ will be determined as described in he PDD version 2, section B.7.1, including who, where and how.	I n the PDD version 3, section B.6.1, sub-step 3(c) , it is presented that $NT_{PJ,k,y}$ is the average number of total testing items where recovery was done per equipment in the project in category k in the year y, derived from the testing records from the corresponding year

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			CAR closed.
CAR 18 PDD version 01 - Description between cylinder and bundle needs to be improved	B.7.3	Description in PDD version 2 improved. The term 'cylinder bundle' is used in the PDD to explain the pairing of two cylinders in a bundle. Explanation in the PDD states: *"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".*	The revised PDD includes the changes presented in the response from the PP. CAR closed.
CAR 19 Monitoring plan shall assign the responsibility of collecting and archiving the information originated at KERIs facilities to SFK.	B.7.10	SFK is responsible for the collection and archiving of information originated at KERI facilities. This is described in document "4 1_01 SF6 project_CDM Monitoring Guidance_AM0079_v01-v07" Section B.7.2 of the PDD was edited to clarify this and now reads, "The overall monitoring responsibility for both the SFK and KERI sites will be with the CDM coordinator of the SF_6 reclamation site (SFK)."	The revised PDD includes the changes presented in the response from the PP. CAR closed.
CAR 20 The PP shall indicate clearly in the PDD the modifications made to the existing installations of both sites (recovery and reclamation) due to the implementation of the project activity.	A.2.5	Modifications to the recovery site are indicated on page 6 of the PDD version 2.	The revised PDD includes the changes presented in the response from the PP. CAR closed
CAR 21	A.1.1.	1. Corrections Done. Second last	All 11 corrections have been implemented

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
Various corrections to the PDD: 1. Correct version number and date within the various PDD version 2. Correct all references made in PDD: date of order for DILO compressor (footnote related to text in section C.1.1. and reference 8.2 DILO Compresor order confirmation date 30.11.2007.pdf 3. Correct/revise units in Financial Analysis, in particular but not exclusively the Sensitivity-I-Revenue (volume) tab of SFK financial analysis. 4. Correct mistake in PDD Page 39 - Project emissions- $R_{SF6,y,j} > R_{SF6,y,j}$... It should read: $R_{SF6,y,j} > R_{SF6\ hist\ ,j}$ 5. Missing specification of monitoring of GWP for SF_6 (in case there are changes in the IPCC /21/). In should be included in both ex-ante and ex-post (ref to methodology). 6. PDD page 46 within description of $MI_{Gas,i,y}$ ("from the cylinder bundle I injected") the index "*i*" is written as capital "I", shall be small "*i*". 7. PDD is missing explanation on "Uncertainty" for using estimated equipment SF_6 capacities in the determination of used gas vented	A.1.2	PDD refers to version 4 date of 30 August 2010.Last PDD changed to version 5, dated of 1 September 2010, both inside the document and in the file name 2. This was simply the name of file. Anyway, to avoid confusion we are changing the name of it. 3. Changes done in the line 9 (correcting the amount of contaminated SF_6) and in cell D16 in all the cashflows (added refernece to the reference tab). Some few other editorial changes. Everything looks consistent and correct now. 4. Correction done. It reads now $R_{SF6\ hist,j}$ 5. Value added in both (not monitored and monitored parameters), 6. Parameter called MI - PDD reviewed to be consistent with the Methodology "$MI_{Gas,i,y}$" or "$MI_{Gas,i}$" 7. Comment added 8. Description added. In section B.6.2 there is a detailed explanation of sub index "j" (page 35). Changes were done in section B.6.3 also to explicit to each process "j" the calculations are referring to.	in the PDD as described by the PP. CAR closed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
during eligible testing item for the historic baseline year (requirement specified in the methodology, in the comments box in the definition of $TISF_{6,used,t}$. See box "any comment" for parameter ID number 03 "$TISF_{6,used,t}$", under "Parameters related to baseline emissions", page 13 of the methodology. 8. Description of parameter $EF_{elec,j,y}$ in section B.6.2 shall include explanation of sub-indexes "*j*" and "*y*". 9. Inconsistency between CAR 10 response (and therefore the PDD) addressing 9.2 tonnes/yr and 4.3 kg/hr, and response to CL 47 addressing 8.33 tonnes/yr and a procedure that requires about 5 kg /hr. Clarify/align response and substantiate with explanation and present precise (references to page and paragraph number). 10. Include in the PDD all dates and references regarding CDM consideration prior to signing ERPA with ESL. 11. Correct the value of annual SF_6 production from 9.2 to 9.7 tonnes per year		9. There was a confusion between expected values and real values. Anyway, the answers were changed to avoid any misunderstanding. Changes are in track changes. 10. Dates added to the PDD. 11. They are result of a calculation based on the unitary cost of savings (USD/kg SF_6) and the amount of SF reclaimed. Please go to the financial analysis spreadsheet. You will see there that the cell E18 of "Input-Results" tab remains the same (2.66) in all the version of F.A. analysis. Given that there was a confusion if the reclamation rate would be 9.2 or 9.7, in the first calculation it referred to 9.2 (if you repeat the operation 2.66 * 9.2*1000 you will see that it's equivalent to 24 387 - differences are related to rounding). The current value is simply the multiplication of the amount of SF_6 reclaimed per saving (2.66 * 9.691). References to reclamation rates of 9.2 tonnes per year were changed to 9.7 along the PDD to have all the documents consistent.	

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		The PDD changes are in Track Changes. No changes were done to the F.A. analysis. Here is an explanation from another person within the PP team, who participated also on the Meth Development of this project for the values 9.2 and 9.7: In 05/2008 EcoSecurities assumed a used SF_6 amount of 9,560 kg from an estimate made by KERI based on testing records for 05/01/2007 to 27/12/2007. This amount of gas would fit into 15.9 cylinders of 600 kg capacity. This was translated into the assumption that the project would fill 16 cylinders of 600 kg per year. 16 cylinders X 600 kg X 0.96 kg SF_6/kgusedgas = 9,216 kg SF_6 = 9.2 t SF_6. This assumption was used wider in the financial analysis. However it is incorrect because fundamentally it relies on an estimate made by KERI in which KERI assigned SF_6 capacities of its choosing to each test record from the stated 2007 period. Value 9.7 t used SF_6: correct Since 06/2008 KERI measures the amount of used SF_6	

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		gas recovered onsite and SFK analyses the SF_6 content of the used gas. The validation PDD was developed based upon measurements of used gas recovered at KERI between 01/06/2008 and 20/01/2009 and the amount of SF_6 in that used gas. The amount for this approximately 8 month period (6,475.7 kg) was projected to a 12 month period (9,713.5). This information is provided in tab "BE_1-BE Calculation" of the CER calculation workbook. This assumption of 9.7 tonnes is correct, since it is based upon actual measurements of amount of used gas recovered at KERI.	
CAR 22 The PP shall correct the following points within the PDD and project documentation: 1) Ensure there is consistency in the values presented in both documents (PDD and FA), in particular with the sensitivity table values (Page 20/21 in PDD and tab "Input-Results" in FA). Please revise also the other values to double check. Input values (table B5.2) , FA result for incineration (table B.4.1) , FA result for the project (B.5.3) and Sensitive	A.1.1 A.1.2 A.2.4 B.5.1	1) Latest versions of PDD and financial revised, information shown is now consistent. 2) The references to the versions numbers have been removed along the text, thus this inconsistency is no more applicable in the text. The tables B.5.3 and B.5.4 were updated and have the same values as in the FA. 3) Values corrected in the text "investment cost section" and "operation cost section" of the	DNV has reviewed the PDD and confirmed that the 5 corrections/changes are implemented. CAR closed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
analysis (B.5.4). 2) Ensure consistency in the version of the references to the FA declared in the PDD, as for example on top of page 20 its refer to version 01.7, while the latest is v01.9. Revise all this types of references throughout the PDD to the latest version of CER and FA files. 3) Ensure consistency among the values shown whiten the discussions presented in the PDD (e.g. tables vs. text), particularly in the sensitivity analysis section that you are going to correct now.. 4) Again, in case you make any changes to any document, please assign a new version and write it in Section A.1 of the PDD 5) Correct typo mistake in PDD page 21, first bullet point, last sentence: "beyond the variation presented in the table above lis unlikely.", remove "L" before "is unlikely" "L" deleted, correction done.		sensitive analysis. 4) Version corrected in section A.1 of PDD. PDD updated to version 5.1 in file name and inside the document 5) "L" deleted, correction done.	
CAR 23 With regards to the monitoring parameters, revise and complete as necessary: the description of each of the equipment used, its accuracy, its maintenance and calibration requirements, and the frequency of the measurement and its adequacy according to the parameter to be monitor under the project activity.	B.7.3 B.7.4 B.7.5 B.7.6 B.7.7	The required information has been included in the latest version of the PDD. Specific instrument information can be found in the following files: • "Spec of instrument related CDM(analyzer).xls" • "Magnetic float level gauge.pdf" • "pressure gauge.pdf" • "temperature gauge.pdf"	DNV has been able to verify the information provided, and finds it sufficient to address the issue raised. CAR closed.
CL 1 PDD version 01 - Page 12. Total capacity of	A.1.2 B.2.7	Refer to document '8.1 Onsan 2008 Production summary-	DNV has been able to verify the total generated amount based on the document

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
SF_6 production at the SKF facility is around 1,500 tonnes per year (Design Production Capacity). In 2008 (a year with normal operations) the total generated amount was1,009.4 tonnes. Document to be provided.		CONFIDENTIAL'.	submitted. CL closed.
CL 2 PDD version 01 - Page 15. Preliminary tests done by SFK demonstrate that gas used at KERI shows low impurities. Preliminary tests to be provided.	B.4.7 B.4.8	"Preliminary tests" referred to a test performed in 2007 when the project participants were examining the possibility of the project. The test performed at that time showed that SF_6 content was around 83.3%. This number was used in the PDD submitted with the new methodology in Nov 2007. Unfortunately, we are unable to find these documents. However, this is of minimal importance: Current tests show SF_6 content of 98-99%. The reference in page 15 of the PDD refers to the fact that based on the contamination levels examined in 2007, reclamation could still happen and that incineration would not be a suitable choice. Incineration could only be a suitable choice in cases that SF_6 content was lower than 70%. Thus with 83.3% SF_6, incineration would not be a realistic option. The fact that the contamination is now shown to be even smaller, strengthens the point that incineration is not a viable baseline option. The phrasing in PDD version 2 has been changed to reflect this as below:	DNV agrees with the explanation presented by the PP, and the revised PDD includes the changes presented in the response given. CL closed

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		'*Furthermore, incineration has been demonstrated to be unnecessary because tests done by SFK demonstrate that gas used at KERI shows low impurities (98-99%) and will always be suitable for reclamation under foreseeable circumstances*.'	
CL 3 PDD version 01 - Page 37. Vehicle Fuel Consumption (volume) (from Truck specification) 0.285 l/km, change to 0.1 l / km based on new document. Document to be provided	B.6.23	PDD updated; Refer to document '8.5 SFK Vehicle petrol consumption'.	DNV confirms that the fuel consumption as indicated in the evidence provided is 10.1 km/l, equivalent to 0.1 l/km. CL closed.
CL 4 PDD version 01 - Page 37. Fuel Density 0.85. Improve reference	B.6.23	Reference improved in PDD, see B.6.3, Leakage section where: 'Fuel Density: 0.85 kg/liter. Source: http://en.wikipedia.org/wiki/Diesel_Fuel'	DNV has verified that the information presented in the response of the PP conforms to the one presented in the reference given. CL closed.
CL 5 PDD version 01 - Page 22. Estimated historical annual SF_6 venting of the SF_6 recovery site, the most recent one year historical data calendar year being 2007. Updated baseline database to be provided	B.4.7	Estimated historical annual SF_6 venting for 2007 is 6. 929 t used gas. Updated baseline provided in SF6_CER Cal_V3.0_111109	See also CAR 4 above. The PP, has provided DNV with an updated database and calculation of the historical venting of SF_6 for 2007. Furthermore, the PP has also presented an explanation for the calculation of the amount of SF_6 gas required for a given equipment as a function of: • the type of equipment (Live or Dead type equipment), • the equipment compartments, and, • the number of phases.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			See file "response to CAR4 CL5.pdf" /46/. Such explanation, in conjunction with the response presented herein, suffices the issue raised by DNV. CL closed
CL 6 Regarding the history of the project, provide a more detailed description, specifically regarding the CDM consideration for this project (before ESL involvement)	B.5.5	Refer to document **'9.**1 SFK-CDM timeline v01' provides a detailed timeline of CDM consideration. The document refers to the following documents, which are in addition to the ones already provided: 9.2a CDM SF6 Recycling Gespräch 07 Oct 2004 9.2b CDM SF6 Recycling Gespräch 07 Oct 2004-Translation 9.3 Presentation by Consultancy RCC 9.4 Copy of documents preceding RCC 9.5 Meeting with KERI 9.6 Quote requested for Compressor 9.7 Email-Blue Ocean Project CDM 9.8 CDM budget approval for 2008	It is clear from the evidence provided that the project developer (SFK) has intended to develop the project activity as a CDM project and considered the CDM benefits from the early stages of the project prior to start date. CL closed.
CL 7 A budget allocation is not considered a "real commitment" and therefore can't be used as a start date for the project activity. Update the starting date of the project as the date when the accumulated committed costs were substantial with respect to the total project costs. Also provide evidence documenting such information (e.g. orders) showing date, amount	B.5.5	Refer to document '8.2 DILO Compressor order confirmation date 30.11.2007' where the date of order confirmation is the 30.11.2007. The date of payment is 09.04.2008. The order confirmation is related to a quotation dated of 19.11.2007, and approved on 23.11.2007. Therefore, 23.11.2007 is considered to be the start date of the CDM project as the purchase order signifies a commitment from the project	The starting date of the project activity is then 23 November 2007, when the DILO compressor purchase order was issued by SFK. See also CL 34 CL closed

<table>
<tr><th>Corrective action and/ or clarification requests</th><th>Reference to Table 2</th><th>Response by project participants</th><th>Validation conclusion</th></tr>
<tr><td>and currency.</td><td></td><td>participant side to move ahead with the project. Table B.5.1 and C.1.1. in PDD has been updated to reflect this.</td><td></td></tr>
<tr><td>CL 8
PDD version 01 – Page8. Assuming 7,920h/year of operation that would be a reclamation potential of around 23.8 tonnes of used SF_6 per year.
Submit the calculations and evidence for estimating “7,920h/year”.
Also considering rephrasing the sentence.</td><td>B.6.20</td><td>This text was misleading. It has been deleted and replaced, now reading, “It is expected that the average amount of SF_6 reclaimed will be around 9.7 tonnes of used SF_6 per year.”
Updated in PDD version 2</td><td>The revised PDD version 3 includes the changes presented in the response from the PP.

CL closed</td></tr>
<tr><td>CL 9
Investment Analysis – provide evidence showing salary band of those who carry out the injection work (labour costs)</td><td>B.5.23
B.5.26</td><td>It is not possible to provide to the DOE a document like an internal HR guidance of SFK regarding salary ranges. Therefore, an indirect way to calculate an overall average salary of a worker in SFK is provided. Document ‘8.6_1_SFK Salary ranges’ shows the total amount of funds spent by SFK on salaries, insurance and pension funds for its employees. Document ‘8.6_2_SFK Salary calculation’ provides a calculation which results to an average salary of 23,366 KRW/hour.
In the document ‘7-1-CDM Labour cost’ is (currency in units KRW):

<table>
<tr><th></th><th>Cell Crew Man</th><th>QC</th><th>Biz</th></tr>
<tr><td>Cost</td><td>20,725,706</td><td>1,087,714</td><td>310,228</td></tr>
<tr><td>Hours</td><td>960</td><td>80</td><td>20</td></tr>
<tr><td>Cost/ hour</td><td>21,589</td><td>13,596</td><td>15,511</td></tr>
</table>

This shows the estimation of labour costs</td><td>DNV has reviewed the explanation presented by the PP and the references given and find them sufficiently as for justifying the salary level of the personnel involved at the reclamation site.

CL closed.</td></tr>
</table>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		back in 2007 and applied in the financial analysis was a bit low. Considering that the sensitivity analysis based on 'cashflow 3' demonstrates a need of reduction of operational expenses by 110% to reach the 9.26% benchmark, the impact of the labour costs to the attractiveness of the project is marginal.	
CL 10 Investment Analysis – Provide clear evidence of material cost for purification of SF_6.	B.5.23 B.5.26	The main chemicals used are Z3 and Z5. It was not possible to find a third-party document to demonstrate the prices of these chemicals in 2007. However, the prices in 2008, as in document '8.9 Z5_Z3 Price' were: Z5: 6,050 KRW/Kg (3,980 in 2007) Z3: 5,400 KRW/Kg (4,915 in 2007) In both cases the current prices are higher than the ones estimated in the 2007 assessment, which is conservative for this project-related cost.	DNV finds the explanation and justification (reference documents) given by the PP sufficient to justify the values used in the investment analysis for the cost of the materials used in the purification process. CL closed
CL 11 Investment Analysis – Provide evidence of purchase of equipment (Receipt to demonstrate actual purchase)	B.5.5	Refer to document '8.2 DILO Compresor order confirmation date 30.11.2007' for a proof of the actual purchase of the main equipment (DILO compressor).	DNV has verified that the reference provided relates to the equipment in question. Furthermore, DNV has also verified the cost Spectrum Analyser (reference "7-7-Cost of SF6 analyser.pdf") which is of a similar order of magnitude as the DILO compressor (see CL 34)

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			CL closed
CL 12 Investment Analysis – Make note in the FA spreadsheet that labour cost is included in the total piping cost .	B.5.16 B.5.25	Note added in document 'SFK_FinancialAnalysis_(NS KL)_v01.5_061109', see cells H25/H28/H31 in worksheet 'Inputs-Reference checklist'.	DNV has verified that the financial analysis includes the specification as per the response of the PP. CL closed.
CL 13 Investment Analysis – Date of the document should be indicated	B.5.25	The investment analysis is for Q3 2007 and therefore represents the economic decision making context at point of the decision to implement the project. Its input information dates from prior to the starting date of the project activity.	The date when the investment analysis was clarified, and it was demonstrated that the investment analysis represents the information that was valid at the time of decision making. CL closed
CL 14 Investment Analysis – Improve explanation how the cost is calculated in USD/kW	B.5.25	Clarified during validation site visit. The exchange rate has been added in 'Table B.5.2. Main parameters used in the investment analysis of the PDD v2.	The PDD has been modified and the currency units are easier to identify. CL closed
CL 15 Investment Analysis – Clear description on how steam tariff was calculated	B.5.25	The provided document '7-18-Steam tariff' shows a tariff of 35,575 KRW/ tonne of steam. A supporting document is provided, '8.7 SFK Steam tariff' which documents the tariff for the 2007 and 2008 years. In 2007.09 the steam tariff was 35,575 KRW/MT.	The PP has submitted historic data in the references provided where DNV has been able to verify the steam tariff. CL closed.
CL 16 Investment Analysis –Provide explanation	B.5.13	The value is taken from an independent financial markets specialist (Bloomberg	The PP shall demonstrate that the basis and assumptions of the model/tool

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
why the Bloomberg value would be acceptable, and present further evidence of how the 9.26% was obtained including the background information considered.		L.P.) who provides market information to the investor community. Data from such services are widely used in the financial world and can be accepted as relevant and credible market information to estimate financial indicators. The value is shown in a screenshot copied from EcoSecurities' Bloomberg terminal (already provided as "7-25-Solvay SA WACC Bloomber Q3 2007'), which is a service that provides real-time financial market information. This service is called Bloomberg professional service, provided by Bloomberg Finance L.P. The WACC of Solvay is calculated by Bloomberg based on publicly available financial data, as Solvay is a publically listed company. The WACC is the minimum return that Solvay would need for any of its investments at a particular period. In reality, any company would require an investment return higher that the WACC. By using the WACC of Solvay SA in our financial analysis, we are presenting a very conservative scenario.	(Bloomberg) and the model itself used for determining the benchmark of the project is applicable to the specific conditions of the project and not only a generalization of market trends. It is recommended the PP use historical information from SFK, if available.
CL 16 (continued) The PP shall demonstrate that the basis and		Solvay Fluor Korea Co. Ltd. (SFK) is a wholly owned subsidiary of Solvay	According to the EB Guidelines on the Assessment of Investment Analysis /51/

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
assumptions of the model/tool (Bloomberg) and the model itself used for determining the discount rate of the project is applicable to the specific conditions of the project and not only a generalization of market trends. It is recommended the PP use historical information from SFK, if available.		Fluor GmbH (/43/), which is a wholly owned subsidiary of Solvay S.A. (/47/). Investments at SFK must be approved by the parent company, which was the case for the CDM project (/48/ /49/).Therefore, it is conservative to apply the WACC of the parent company Solvay S.A. for investment decisions made at SFK, because it can be assumed that the WACC for Belgian Solvay S.A. would be lower or equal to that of its Korean subsidiary SFK. The WACC of Solvay S.A. applied here was calculated by an external expert, Bloomberg Professional Service (http://about.bloomberg.com/product.html), of Bloomberg L.P. "The New York-based company employs more than 10,000 people in over 135 offices around the world. The BLOOMBERG PROFESSIONAL® service, the core product of Bloomberg, is the fastest-growing real-time financial information network in the world" (http://about.bloomberg.com/company.html). Thus, although the methodology of the Solvay S.A. WACC calculation is not available as this is Bloomberg proprietary information, the Solvay S.A. WACC can be considered reliable, to	Guidance 14 states: "Internal company benchmarks/expected returns (including those used as the expected return on equity in the calculation of a weighted average cost of capital - WACC), should only be applied in cases where there is only one possible project developer and should be demonstrated to have been used for similar projects with similar risks, developed by the same company or, if the company is brand new, would have been used for similar projects in the same sector in the country/region. This shall require as a minimum clear evidence of the resolution by the company's Board and/or shareholders and will require the validating DOE to undertake a thorough assessment of the financial statements of the project developer - including the proposed WACC - to assess the past financial behaviour of the entity during at least the last 3 years in relation to similar projects.". The Rationale is: "Paragraph 4 of the Tool for the demonstration and assessment of additionality (version 3) requires that benchmarks should not include the subjective profitability expectations or risk profile of a

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		have been calculated using standard procedures, and to not be influenced by the project participants. In general, the WACC may be calculated from government bond rates which are increased by an appropriate risk premium that expresses the additional risk of equity investments over returns on riskless assets. In the case of SFK, the government bond rates would be those of the Republic of Korea. The relevant bond rate, at the time of the investment decision at the end of 2007, is 5.5% (Yields on 3-year Treasury bonds (LHS), "7-30 BoK Financial Stability Report Oct-2007.pdf" /50/, p p 12). This could be applied directly as a very conservative benchmark for the case of the project activity, and would be far more conservative than the actual benchmark of SFK. If 5.5% is applied as a benchmark, the results of the financial analysis are as follows: NPV (USD) • Alternative 1 (continued venting); 0 • Alternative 3 (project activity) With CDM: 11,778,066	particular project developer." In the case of the proposed project activity, since all the investments of SFK are subject to the approval by the parent company, Solvay S.A., DNV finds it relevant and appropriate to present a discount rate relative the same parent company (Solvay S.A.). However, in accordance to the Guidance above, it would have been more appropriate to present the discount rate for other similar projects for which Solvay S.A. has approved the corresponding investments in the recent years, as for example, the 59 946 979 000 KRW investment referred to as "OSF-S05001, Erection of a Fluor Site", or, the 250 000 000 KRW investment referred to as "OSF-N08003, Plant improvements" mentioned both in the budget approval sheet /49/. Although these may not be an exact comparison to the nature of the proposed project activity, there are other factors that are in common such as, investments done by the same parent-daughter companies, within the same country (South Korea is a fairly homogenous country for this purpose all

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		• Alternative 3 (project activity) Without CDM: (521,390) Using this hypothetical discount rate, the conclusion of the additionality analysis could be stated identically as it is in the PDD, "The analysis presented above shows that the proposed Project is additional due to its negative NPV (without considering CDM revenue), the absence of similar activities and the robust evidence of prior consideration of the CDM."	throughout their territory), and within a relatively similar industry (plant improvements and erection of a fluor site, seem very similar investment activities compared to the investment of a reclamation of used SF_6 gas site). However, it can be seen from the financial analysis /39/ that the estimated revenues based on the savings for the reclamation of the used SF_6 gas for the proposed project activity (USD 25 7549 USD/yr) are approximate 50% lower compared with the annual costs of the same (50 876 USD/yr). Thus, without the potential CDM revenues that the project could also derive, there are not other revenues linked to the project activity that could help to fully compensate/offset the project's costs to make it financially attractive. Upon this situation, even if a very conservative discount rate is used, such as the 5.5% rate for government bonds (Yields on 3-year Treasury bonds (LHS), "7-30 BoK Financial Stability Report Oct-2007.pdf" /50/ pp 12), the project activity will not be commercially attractive without the CDM revenues.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			Nonetheless, as the discount rate selected is an internal rate, it remains to be demonstrated that this discount rate has been used for similar projects with similar risk
CL 16 (continued) As the discount rate selected is an internal rate, it remains to be demonstrated that this discount rate has been used for similar projects with similar risk.		Attached is the financial analysis of Solvay's F1EC project ("8.33 SFK_F1EC financial analysis.pdf"). This is the financial analysis for an internal investment project developed in 2008/09, in a similar timeframe as the CDM project. . This document is enough as cross check document and as a reference that the company has used values similar to the WACC for the investment decision making process.	Based on the evidence presented DNV has been able to confirm that the discount rate used for the project named "F1EC" also developed by the project developer is 9%, which is close to the 9.26% used as benchmark for the proposed CDM peorject activity. Therefore DNV finds the benchmark used by the PP in the finanacial analisys of the proposed project activity reasonable and justifiable. CL closed.
CL 17 Investment Analysis – Explain how the transport costs from reference 7-3 in Annex 6 were estimated	B.5.23	The '7-3-Transport costs' is a third party quote for the cost of one way trip for a load of one tonne at 400,000KRW or 400 USD which is a reasonable number considering the material and the distance. Considering that: 400,000 KRW/trip, 2 trips/cylinder bundle, 10 cylinder bundles/yr, the total estimated cost is 8,000,000 KRW.	The evidence and reasoning presented by the PP is sufficient and consistent with the rest of the project's documentation/ information provided to DNV. CL closed.
CL 18	B.5.22	'7-1-CDM Labour Cost' /38/	Labour Cost: The documentation

<table>
<tr><th>Corrective action and/ or clarification requests</th><th>Reference to Table 2</th><th>Response by project participants</th><th>Validation conclusion</th></tr>
<tr>
<td>Investment Analysis –Provide evidence for the following references from Annex 6:
- Reference 7-1, CDM Labour Cost
- Reference 7-4, Material consumption for purification of SF_6
- Reference 7-5, Costs of additional tools and devices</td>
<td>B.5.23</td>
<td>It is not possible to provide to the DOE a document like an internal HR guidance of SFK regarding salary ranges. Therefore, an indirect way to calculate an overall average salary of a worker in SFK is provided. Document ‘8.6_1_SFK Salary ranges’ shows the total amount of funds spent by SFK on salaries, insurance and pension funds for its employees. Document ‘8.6_2_SFK Salary calculation’ provides a calculation which results to an average salary of 23,366 KRW/hour.

In the document ‘7-1-CDM Labour cost’ is (currency in units KRW):

<table>
<tr><th></th><th>Cell Crew Man</th><th>QC</th><th>Biz</th></tr>
<tr><td>Cost</td><td>20,725,706</td><td>1,087,714</td><td>310,228</td></tr>
<tr><td>Hours</td><td>960</td><td>80</td><td>20</td></tr>
<tr><td>Cost/ hour</td><td>21,589</td><td>13,596</td><td>15,511</td></tr>
</table>

This shows the estimation of labour costs back in 2007 and applied in the financial analysis was a bit low.
Considering that the sensitivity analysis based on ‘cashflow 3’ demonstrates a</td>
<td>presented by the PP comes from an external sources (Deloitte consulting company regarding the funds expenditures by SFK on salary, insurances and pension funds), and internal report (average salary calculation). To DNV’s opinion these are authentic and the calculations presented seemed reasonable. Furthermore, DNV agrees that from the sensitivity analysis it can be seen that the labour costs have a minimal impact on the project IRR, and considered the required change (reduction) of 110% to reach the benchmark, a change of such magnitude can’t be reached by labour costs.
Material consumption for purification of SF_6: The PP has presented an invoice for the purchase of these materials, (Z5 – Al2O3, and Z3 – molecular sieve) in June 2008, which justifies that the values used in the financial analysis (May – August /2007) are conservative, respect to those in 2008 (36% lower for Z5 and 9% lower for the Z3).
Csts of additional tools and devices: Although the PP was not able to present direct evidence for cost of these minor components of the project activity, the</td>
</tr>
</table>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		need of reduction of operational expenses by 110% to reach the 9.26% benchmark, the impact of the labour costs to the attractiveness of the project is marginal. '7-4-Material consumption for purification of SF_6' – (See /38/) The main chemicals used are Z3 and Z5. It was not possible to find a third-party document to demonstrate the prices of these chemicals in 2007. However, the prices in 2008, as in document '8.9 Z5_Z3 Price' were: Z5: 6,050 KRW/Kg (3,980 in 2007) Z3: 5,400 KRW/Kg (4,915 in 2007) In both cases the current prices are higher than the ones estimated in the 2007 assessment, which is conservative for this project-related cost. '7-5-Costs of additional tools and devices' – This was an estimation by the project developer for some low value ordinary equipment like sampling cylinder, gasket, steel hose etc. Third party evidence cannot be provided to demonstrate what the value of such equipment was in 2007. The cost for	costs assumed are in DNV's opinion reasonable. DNV also confirmed that even in the most conservative case of considering these cost as zero, the effect in the IRR will not be significant enough for bringing it up to the benchmark level. CL closed for all 3 points.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		year 01 is USD 6,056 over total capital cost of 233,022 or 2.6%. Considering that the sensitivity analysis requires a reduction in investment costs of 195.65%, the estimated cost of this equipment is very small to be of any significance in the financial analysis, and could be set to zero with no impact on the conclusions of the additionality demonstration.	
CL 19 Investment analysis – Revise and document the estimated lifetime for each of the components. Not all equipment listed has a lifetime of 5 years, for most of them it is reasonable to be longer.	C.1.2 C.1.3	EcoSecurities pointed out that the investment analysis already shows results for assumptions of 5 year equipment lifetime and 20 year equipment lifetime. The PDD shows the results of assuming a 20 year equipment lifetime, and is therefore conservative. DNV agreed to recheck the analysis. DNV pointed out that there needs to be an evidence to demonstrate how the project lifetime is determined The project lifetime is determined as the potential lifetime of the DILO compressor, which is the main equipment required for the project activity. The lifetime is 20 years, according to the manufacturer DILO	Given that the compressor (DILO compressor) is at the core of the project activity (to compress the SF_6 gas into the cylinders for transportation from KERI to SFK facilities), and an important component of the approved methodology (AM0079 version 02), the lifetime of this equipment is the key for the operation & maintenance costs of the project (the DILO compressor is the most expensive equipment in the project activity – see also CL 34). Therefore it is a conservative approach to consider it as the one determining this aspect (equipment lifetime) of the financial analysis. CL closed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		Armaturen und Anlagen GmbH (See "8.13 dilo compressor lifetime").	
CL 20 Investment Analysis – Depreciation shall be considered for tax purposes only (calculations in reference 7-27 annex 6).	B.5.17	Since tax is calculated on the basis of the Profit minus Depreciation, it has to be included in the cash flow. The EB guidelines permit to take the non-cash items like depreciation into account but it should be added back. In order to make the FA transparent each step of calculation should be in the cash flow and hence Depreciation should also be in the cash flow. No change made to project documentation.	Based on the further clarifications provided by the PP, DNV was able to confirm that the investment analysis considers depreciation as requires by the Guidelines on the assessment of investment analysis. CL closed.
CL 21 Investment Analysis – Include units in table B.5.2 of the PDD	A.2.4	A *units* column was added to table B.5.2 in the PDD.	The revised PDD has been verified to include the changes presented in the response of the PP. CL closed
CL 22 PDD version 01 page 25, Step 4 "Calculate the baseline emissions", variable name for "Historical annual baseline venting of SF_6, tonnes SF_6" in formula does not correspond to name in description. Revise and correct accordingly.	B.6.17	Corrected	The revised PDD has been verified to include the changes presented in the response of the PP. CL closed

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
CL 23 PDD version 01 page 61, Annex 6 "list of References", reference "1-2 SF6 Quality standard IEC 60376", the document is NOT attached to the PDD. Correct information in column "Attached to the PDD" accordingly.	B.6.17	Corrected in PDD v 2.	The revised PDD has been verified to include the changes presented in the response of the PP. CL closed
CL 24 PDD version 01 page 3, provide explanation for "IEC" abbreviation.	B.6.17	International Electrotechnical Commission; website www.iec.ch Explanation added in PDD version 2.	The revised PDD has been verified to include the changes presented in the response of the PP. CL closed
CL 25 PDD version 01 page 14, figure 3.1. "Flow chart of project boundaries", the schematics does include the purge and the incineration at the reclamation sites. Correct figure accordingly.	B.6.17	In the figure, the purge was added inside the project boundary and incineration was added outside the project boundary. We emphasize that incineration is not planned under the project activity and would only be utilized in cases of exceptional contamination of used SF_6 at levels unforeseen based on experience up to now.	The revised PDD has been verified to include the changes presented in the response of the PP. CL closed
CL 26 The PP shall present to DNV evidence showing that the average prices of the SF_6 have remained within the same range from 2007 to 2009 (9.5-10.5 USD).	B.4.7 B.5.11	Please see internal communication from SFK, document '7.28 SF6_Korean market price Trend_05-09'.	DVR – project revenue The PP shall provide further reference/evidence to support the market prices of SF_6 as indicated in the email from SFK ("7-28 Korean market price trend"/45/), given that the reference in the response provided is (an

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			internal) a communication from within SFK.
CL 26 (continued) DVR – project revenue The PP shall provide further reference/evidence to support the market prices of SF_6 as indicated in the email from SFK ("7-28 Korean market price trend /45/), given that the reference in the response provided is (an internal) a communication from within SFK.		A series of invoices from 2007 and 2008 have been shared with DNV (SF6 Invoices_2007_2008.pdf). Additionally a sample of an SF_6 sales invoice ("8.23 SFK_ SF6 sales invoice_19 May 10.pdf") from 2010 were also shared with DOE. According to the invoice, SF_6 sales price is between USD9 and 10.5/kg, which is in line with the email from SFK, "7-28 and the values applied on the financial analysis	DNV has been able to verify through the evidence presented /59/ a sample of invoices from the sale of SF_6 from 2007, 2008, and 2010 that the price per kg of SF_6 is between the range of $ 9.50 and $10.5 USD. CL closed.
CL 27 The PP is requested to present evidence to substantiate that "There is only one facility in Korea that manufactures SF_6 gases and only one facility that is planning to introduce a reclamation process"	B.5.1 B.5.42 B.5.43	Discussed during the validation visit. DNV expressed concerns that 'Linde Korea' is another SF_6 manufacturing facility in Korea. Mr Dae-jun Han (SFK) explained that Linde Korea is not a SF_6 producer in Korea. He mentioned that although some companies look like SF_6 producers, in reality they only have purification facilities for "e" grade SF_6. This means that they firstly have to buy technical SF_6 from the SF_6 producers like from Solvay, Honeywell, AGC, or some Chinese and Russian companies who are the real SF_6 producers in the world. For example, the brochure from the Dilo/Solvay/Linde SF_6 reclamation program in the USA shows that Linde is	DVR – Additionality from CL 54 Based on the explanation provided, the evidences presented and DNV's 2nd site visit performed on 9th June 2010, DNV finds sufficient evidence to verify that SFK is the only facility of its kind in Korea. CL closed

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		an SF_6 distributor, not a producer ("8.14 Solvay, DILO, Linde - SF6 reuse brochure.pdf"). List of SF_6 production facilities can be found in the link http://www.korchambiz.net/ENG/search/se archTotal.jsp?cgiid=0&qry=SF6, the website of the Korea Chamber of Commerce & Industry (KCCI) which shows that SFK is the only SF_6 producer company. Since reclamation of used SF_6 to technical grade SF_6 can only take place at an SF_6 manufacturing facility, SFK is the only location where this could be introduced in Korea.	
CL 28 provide evidence of the CDM considerations made before decision to proceed with the project by the project owners (SFK) that are in accordance with the "Guidance on the Demonstration and Assessment of Prior consideration of the CDM /8/.	B.5.5	The documents "9.7 Email-Blue Ocean Project CDM" and "9.8 CDM budget approval for 2008" are appropriate evidence, since 9.7 shows that the benefits of the CDM were considered explicitly and are the decisive factor in the proposal to proceed with the project, while 9.8 shows that the management decision to allocate a budget for the CDM project come after assessing the CDM benefits presented in 9.7.	The evidences and explanation presented by the PP are in DNV's opinion sufficient response to justify the CDM consideration made by the PP prior the development of the project activity. CL closed
CL 29 PP to present an explanation why the project was implemented before CDM registration,	B.5.5	The baseline could not be established based on historical records of SF_6 use at the KERI testing site. Therefore initially an entirely ex-post baseline was	The explanation and corresponding evidence presented by the PP in the response is genuine and sufficiently reasonable in DNV's opinion to suffice

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
given that the "Guidance on the Demonstration and Assessment of Prior consideration of the CDM" /8/ states that "the benefits of the CDM were a decisive factor in the decision to proceed with the project".		proposed. In response to the preliminary recommendations on NM0251, the PP proposed instead for the baseline to be established based on one year of historical records of the amount of SF_6 gas vented or filled before the venting instance (see http://cdm.unfccc.int/methodologies/PAmethodologies/publicview.html?meth_ref=NM0251). The PP intended to use measurements from 2008 to fulfill this requirement. Therefore, the project developer was asked to start collecting gas to establish the extent of the baseline over a period of one year of testing at KERI and recovering at SFK. That is why project implementation started prior to project registration. As demonstrated in response to CL 6, there is strong substantiated evidence for CDM consideration before project implementation and methodology submission.	the question raised. CL closed
CL 30 Provide evidence of SFK's design total production capacity (1 500 tonnes/yr). Verify also consistency with values in Investment Analysis - Input Reference Checklist tab (cell E8).	B.6.20	The provided file ("8.18 SFK_plant capacity"), is an excerpt from the SF_6 production facility's project definition stating that the maximum SF_6 theoretical capacity of the plant is 1500 tonnes/year for 330 productive days/yr. Please take note that this document is	DNV has been able to verify that the documentation provided describes among other the design capacity of the SFK plant to be 1 500 tonnes/year of SF_6. With regards to the spreadsheet, it has not been fully corrected though. In row

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		confidential and for internal use only. A 3rd party document cannot be provided since the SF_6 facility was designed internally for confidentiality reasons.	8 "production of Raw SF_6 from used SF6" of the referenced spreadsheet the values/information in cells E8, G8 & H8 needs to be revised and the reference to plant capacity of 1 260 ton in cell I8, needs also top be revised for consistency with the response provided. The PP shall revise all the project documentation to ensure that it is consistent all throughout.
CL 30 (continued) With regards to the spreadsheet, it has not been fully corrected though. In row 8 "production of Raw SF6 from used SF6" of the referenced spreadsheet the values/information in cells E8, G8 & H8 needs to be revised and the reference to plant capacity of 1 260 ton in cell I8, needs also top be revised for consistency with the response provided. The PP shall revise all the project documentation to ensure that it is consistent all throughout.		The project definition documentation signed by the plant manager S.B. Choi ("8.24 SFK_Project definition_15Jun10") has been provided to DNV, explaining the rationale of calculation to reach the value of 1,500 ton/yr as reference for all the explanation provided during the second site visit. Input values in the investment analysis have been corrected.	DNV has been able to review the documentation submitted and the explanation presented and find both reasonable and sufficient to verify that the tocal capacity of the SFK plant, per design, is 1 500 SF_6ton/year. CL Closed
CL 31 Correct PDD - reclamation value from 3.0 to 4.299 kg/hr based on "8.16 07.08-02.09 Used SF6 Reclamation rate.xlsx" /20/, as well as the percentage of reclamation to the total production (from 2% to 3%).	B.6.20	The PDD was changed accordingly to the latest version of SF_6 Reclamation process operational procedure. According to this document it is defined that the reclamation process shall target a reclamation rate of 5kg/hr. This value	The PP has corrected the PDD applicability table (section B.2) regarding the reclamation rate. CL Closed

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		is more representative of the practices in place. Monitored data as presented before is similar to the value presented above and corroborate the Project Developer intention to operate close to this pattern. PDD has been changed accordingly on page 12 to reflect these changes.	
CL 32 Provide evidence of SFK's annual plant operation hours (7 920 hr/yr).	B.6.20	The project definition documentation signed by the plant manager S.B. Choi ("8.24 SFK_Project definition_15Jun10") was provided to DNV, explaining the rationale for the production capacity definition. On this document is stated an expected plant operation of 330 days per year, equivalent to 7920 hours. Given this value was just presented for reference, it will no longer be used in the PDD, all references to it were excluded.	The PP has presented the evidence regarding the plant design where it is stated the intended operational time per year for the plant, namely 7 920 hr/yr). The revised PDD has been verified to include the changes presented in the response of the PP. CL closed
CL 33 Provide the calculations, data and references/evidences for the estimated number of round trips per year between the recovery and reclamation sties.	B.6.20 B.6.23	Based on the latest monitoring sheet of SFK ("8.19 SFK_SF6 Reclamation Data_30 Mar 10"), actual number of cylinder-bundle recovered in one (1) year is ten (10) for the recovery period 01 June 2008 to 08 July 2009 which means number of round trips is also 10. This is consistent with the estimated number of trips in the PDD. For your reference, provided is the monitoring	Based on the explanation and evidences provided DNV has been able to verify the estimated value of approximately 10 bundles (trips) per year. CL closed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		sheet from SFK. Provided is an invoice ("8.20 SFK_SF6 transport invoice") from the company handling transportation of the cylinders.	
CL 34 Project start date has been chosen as 30 Nov 2007 as indicated in the PO for the compressor, However, the invoice for the SF_6 Spectrum Analyzer (7-7-Cost of SF6 analyser.pdf) shows a date of 15 March 2007. /31/37/ Furthermore, considering that the investment value of both the compressor and the analyzer are comparable, the date of the oldest invoice/purchase order of these two shall be selected as Project start date	B.5.5 C.1.2	PDD v3.1 was changed accordingly on pages 18 and 22 to reflect the start date as 23 Nov 2007 from 30 Nov 2007. The document dated 15 March 2007 for the SF_6 Spectrum Analyzer is only a quotation and not an invoice, thus, it cannot be considered as the project start date. The document was used for investment analysis purposes only since it's the available data at the time the analysis was done. The Order Confirmation is dated 30 Nov 2007 is both for the DILO compressor and the SF_6 Spectrum Analyzer (it is a bundled equipment). as presented in the document '8.2 DILO Compressor order confirmation date 30.11.2007.pdf' . Refer to answer of CL 7 for more details on this date.	The PP is requested to present the purchase order submitted to the supplier of the SF_6 Spectrum Analyser with the corresponding date as well as the corresponding order confirmation & invoice. The evidence submitted /60/does specify the 2 compressors, however does not specify the spectrum analyser as part of the set of SF_6 handling equipment. Furthermore, the price stated of EUR 67 792.06 does not seem to include the spectrum analyzer considering that both, the compressors and the spectrum analyzer have a similar price tag; see PDD Table B.5.2. "Main parameters used in the investment analysis", where it is declared that the cost (price) of the Spectrum Analyzer is USD 56 338.-, piping USD 52 828.-and the DILO compressors USD 53 629.-, and reference /37/
CL 34 (continued)		The SF6 Spectrum Analyser has been	DNV has reviewed the new version of

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
The PP is requested to present the purchase order submitted to the supplier of the SF6 Spectrum Analyser with the corresponding date as well as the corresponding order confirmation & invoice.		removed in the investment analysis and the PDD since the analyser currently used in the CDM project is the analyser that Solvay has been using in analysing the SF6 produced by the plant even before the CDM project (prior to 2007). The SF6 Analyser or SF6 Volume Percentage Analyser purchased with the DILO compressor was never used to analyse the SF6 impurities since its ability to analyse recovered SF6 is limited. Financial Analysis and PDD were adjusted to reflect this change.	the PDD and the investment analysis and cofirms that the cost for the Spectrum analyser is no longer included. This is a conservative approach and DNV finds therefore, from this perspective, this response sufficient. The start date of the project activity is then 23 November 2007 as per the purchase order of the DILO compresseor /31/ (See also CL 7). CL closed.
CL 35 Evidence date for Budget approval is 7 January 2008 /45/, not 14 December 2007 (PDD) /32/	B.5.5 C.1.2	The date 14 December 2007 was never used in the PDD ("SF6_PDD_V2.4_170210") for budget approval.	The further clarifications provided address the CL. CL closed
CL 36 The PP is requested to provide the exact and precise reference of the national standard used for depreciation /36/	B.5.17	According to Annex 5, Clause 3 of Article 15 under the chapter of "Corporation Income Tax and Enforcement Regulations (http://likms.assembly.go.kr/law/jsp/Law.jsp?WORK_TYPE=LAW_BON&LAW_ID=D1123&PROM_NO=00139&PROM_DT=20100331&HanChk=Y),	According to the regulation, the service life time for vehicles and vehicular contrivance, tools and apparatus is indicated as 5 years with range 4 ~ 6 years. CL closed

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		average standard service life for vehicles and vehicular contrivance, tools, apparatus and equipments is 5 years (lower limit is 4 years and upper limit is 6 years).	
CL 37 PDD page 18, step 2 – Barrier Analysis, change/ correct from "Alternative 1" to "Alternative 3", since it is the one with the lack of financial attractiveness.	B.4.1 B.5.29	PDD v3 was changed accordingly on page 18.	The revised PDD has been verified to include the changes presented in the response of the PP. CL closed
CL 38 Provide evidences for all the input values in the file "7-26-Solvay - plant data request.xls" as well as explanation for the file calculations	B.4.4 B.5.25	Input values are based on the "8.25 SFK_2007 Production Report" and "8.26 SFK_electricity consumption_May07 to Aug07.pdf". Both documents were presented to the DOE during a second site visit. File has been revised for easier comprehension ("7-26-Solvay - plant data request_v 2.xls"), explanation of the values are inserted as comments in the file	DNV has been able to review the evidence submitted and can confirm that the values presented in the calculations are reasonable and are taken from electricity invoices and internal production reports. CL closed
CL 39 Values for "Electricity use in SF_6 production line after Electrolysis" from file "7-26-Solvay - plant data request.xls", not included in input parameters of financial analysis (see cell E12 of "Inputs-Reference Checklist" tab	B.5.23	This value was not included since this electricity is already included in the "Material consumption for purification of SF_6". The plant electrical diagram was provided to the DOE during the second site visit for confirmation of it.	The PP is requested to explain the relationship between the files "7-26-Solvay - plant data request_v 2.xls" /45/ and "7-4-Material consumption for purification of SF6_v 2.xls" /38/ and to also explain how the values are considered/included within the investment analysis /39/.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			This CL (CL 39) continues under CL 40 below. CL closed.
CL 40 The PP is requested to explain the relationship between the files "7-26-Solvay - plant data request_v 2.xls" /45/ and "7-4-Material consumption for purification of SF6_v 2.xls" /38/ and to also explain how the values are considered/included within the investment analysis /39/.	B.4.4 B.5.23 B.5.25	Electricity is used in the SF_6 production during and after SF_6 electrolysis that's why both are in the "7-26-Solvay - plant data request_v 2.xls". Electricity use during SF_6 electrolysis is part of the avoided cost or savings by reprocessing used SF_6, included in the input parameters as the "average electricity consumption for SF_6 electrolysis" in the investment analysis. There is a meter in the plant to measure this variable specifically. On the other hand, electricity use after electrolysis is part of the "Material Consumption for the Purification of SF_6" which is part of the operating cost. Given that it includes some few processes on this electricity consumption (there was no meter specific for each part of the process), and approximation of how much electricity was consumed by each process was done based on motor	DNV has been able to verify the correlation of the information presented in the files in question, and as explained in the response of the PP, these values are indeed considered within the investment analysis. CL closed

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		capacity of each process. The variable "Electricity Consumption after Electrolysis for SF_6" in "7-26-Solvay - plant data request_v 2.xls"is calculated based on motors of it process and is used as reference in "7-4-Material consumption for purification of SF6_v 2.xls". The figure A.4.3.1 presented in the PDD helps to understand the differentiation between the electrolysis and the other processes.	
CL 41 Provide evidences for all the input values in the file "7-4-Material consumption for purification of SF6.pdf" as well as explanation for the file calculations	B.5.23	Input values are based on the "8.25 SFK_2007 Production Report" and "8.26 SFK_electricity consumption_May07 to Aug07.pdf". Both documents were presented to the DOE during a second site visit. Input values are based on the "2007 Production Report_raw material". Data for the months of May to August 2007 were averaged to get the unit consumption. File has been revised for easier comprehension ("7-4-Material consumption for purification of SF6_v 2.xls"), explanation of the values are inserted as comments in the file.	The PP is requested to explain the relationship between the files "8.25 SFK_ 2007 Production Report.pdf" /61//63/, "8.26 SFK_electricity consumption_May07 to Aug07.pdf" /62/ and "8.27 SFK_2007 Production Report_Raw material.pdf" /63 and to also explain how these values are considered/included within the investment analysis /39/. CL closed under CL 42 - See CL42 CL closed.
CL 42 The PP is requested to explain the relationship between the files "8.25 SFK_ 2007	B.4.4 B.5.23	The file "8.25 SFK_ 2007 Production Report.pdf" is the basis of the values (electricity, sulphur, AHF and SF_6) used	DNV has been able to verify the correlation of the information presented in the files in question, and as explained

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
Production Report.pdf"/61//63/, "8.26 SFK_electricity consumption_May07 to Aug07.pdf" /62/ and "8.27 SFK_2007 Production Report_Raw material.pdf" /63/ and to also explain how these values are considered/included within the investment analysis /39/.		in the file "7-26-Solvay - plant data request_v 2.xls" which is used as reference for the input parameters in the investment analysis. The file "8.26 SFK_electricity consumption_May07 to Aug07.pdf" is a supporting document for the electricity used in the "8.25 SFK_ 2007 Production Report.pdf". On the other hand, "8.27 SFK_2007 Production Report_Raw material.pdf" is the basis for the steam value in "7-26-Solvay - plant data request_v 2.xls" and the values for the raw materials (KOH, Oleum, Z5, Z3, TW) used in "7-4-Material consumption for purification of SF6_v 2.xls" which is used as reference for "Chemicals for SF_6 Purification" as part of the operating cost in the investment analysis. All the calculations were done in a conservative way. As result, the final number used as Operating Costs can be considered very conservative given it was calculated to an equivalent of only 5 tonnes of SF_6 reclaimed as presented in cell F13 of "Results" tab in "7-4-Material consumption for purification of SF6_v 2.xls" (while the expected reclamation is around 9.7 tons).	in the reposnse of the PP, these values are indeed considered within the investment analysis. CL closed
CL 43	B.5.23	Project Developer was not able to trace	DNV find the PP approach reasonable

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
Provide evidences for all the input values in the file "7-5-Costs of additional tools and devices.pdf" as well as explanation for the file calculations		all the documents that were used as reference for this file. This will be excluded in the calculations since its effect on the financial analysis is marginal.	and conservative in view of the circumstances. CL closed
CL 44 Is venting common practice in KERI or in the industry in General? Substantiate and present evidence.	B.4.4 B.4.7 B.5.1 B.5.43	As discussed in the "Common Practice Analysis", KERI is the only accredited high power testing facility in Korea that routinely undertake tests that use and contaminate SF_6. In CAR 7, letters from three of KERI's main clients, who confirmed that venting was the common practice at KERI, were presented: '8.10a_VentConfirm(HyundaiHeavyIndustries)' '8.10b_VentConfirm(Hyosung)' '8.10c_VentConfirm(LS Industrial Systems) Keri is the only institution able to develop the tests related to the CDM project (i.e., high power tests using SF_6). In most other tests, however, gas (any gas) is not used at all because the status in the tests should be VACUUM. Then, there would be no venting gases in other testing facilities/institutions in general. In case of low voltage tests, SF_6 gas is	The question raised refers to the practice of the industry in general (not only at KERI's facilities). However, based on the response from the PP, DNV has been able to verify that given that KERI is the only testing facility where the conditions for the project activity take place within the geographical area of Korea and relevant nearby countries (see also CAR6), the common practice in KERI can be considered as the common practice of the "industry". DNV therefore finds the response of the PP sufficient and reasonable. CL closed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		used though. But, unlike high power tests, this type of tests does not contaminate the (SF_6) gas and the gas may be re-used in the process. In short, the high power test is the only test that actually contaminates gas because it generates arcs.	
CL 45 DVR-Applicability of methodology: "Reclaimed SF_6 is a minor component of the total SF_6 production of the SF_6 reclamation site (less than 5% of total production)". Page 8 addresses an average reclamation of 9.7 while in page 12 it is 23.8 tonnes of SF_6. See CAR 10 where PP has stated to have corrected this issue in PDD v.2, page 8, but the issue still remains. Since page 12 still shows 23.8 tonnes of SF_6. This should be corrected to have the same estimation. All related data/information in the PDD shall be updated accordingly.	B.2.7	PDD v3 was changed accordingly on page 12.	The revied PDD has been verified to include the changes presented in the response of the PP. CL closed
CL 46 DVR-Applicability of methodology: "Reclaimed SF_6 is a minor component of the total SF_6 production of the SF_6 reclamation site (less than 5% of total production)".	B.2.7	PDD v3 was changed accordingly on page 12.	The revised PDD has been verified to include the changes presented in the response of the PP. CL closed

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
Also (see CL45), elsewhere in the PDD it is confirmed that the injection rate of used SF_6 is between 3 to 10 kg/hr. Page 12 addresses reclamation rate at 3 kg/hr. This should be corrected to have the same estimation and basis for calculation/estimation of this value.			
CL 47 DVR-Applicability of methodology: "Reclaimed SF_6 is a minor component of the total SF_6 production of the SF_6 reclamation site (less than 5% of total production)". Assuming that injection rate and reclamation rates mean/are the same in practice, then at the upper end of the range, this condition of the methodology may not be fulfilled. Demonstrate how the project specific conditions will ensure that the applicability of the methodology will be satisfied at all times. Include in the explanation how this will controlled.	B.2.7 B.2.14	Based on the plant capacity of 1500 tonnes/yr, reclaimed SF_6 should not exceed 75 tonnes/yr (0.05*1500). Reclamation of SF_6 does not always operate at the same time as the SF6 plant, it's usually less. From the latest data on reclaimed SF_6, average time the cylinders are delivered from recovery site to reclamation site is every 45 days which means that reclamation can't happen daily for 330 days in a row. Reclaiming SF_6 at maximum (10 kg.hr), is also avoided to ensure the quality of the processed SF_6. According to the SF_6 Reclamation process operational procedure, it is defined that the reclamation process shall target a reclamation rate of 5kg/hr. This value is more representative of the practices in place. Monitored data as presented before is similar to the value presented above and corroborate the Project	Based on the collected data for 2009 /70/45/ (file reference "*8.19 SFK_SF6 Reclamation Data_30 Mar 10.xls*"), showing that the actual operating volumes of reclaimed SF_6 gas are equivalent to 0.56% of the production capacity /65 and 0.86% of the actual SF_6 produced /70, it is unlikely that the annual amount of reclaimed used SF_6 gas becomes higher than 5% of the productions capacity of SFK production facility, DNV finds the response sufficient to satisfy the issue raised. CL closed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		Developer intention to operate close to this pattern. Also, based on 2009 data, actual SF_6 reclaimed is 8.33 tonnes, only 0.56 % of production capacity and 0.86% of actual SF_6 produced (964.9 tonnes). It was shown in the sensitivity analysis that a high increase in the amount of SF_6 reclaimed is very unlikely.	
CL 48 DVR- Identification of alternatives to the project activity. Substantiate that no other SF_6 reclamation (production) facilities exist in the Host Country, and that KERI is also the only facility of its type in Korea.	B.4.1	Please refer to answer in CL 27. As explained in the Common Practice Analysis, KERI is the only third party independent High Power High Voltage Testing Facility in Korea which can be concluded from the companies/testing facilities listed in Table B.5.5 that utilise SF_6 gases in the relevant geographical area. There is one facility, Power Testing & Technology Institute, in Korea that also performs high-power testing but it is for internal use and its scale of operation is small and not comparable to the project site therefore it is excluded. Letters from three of KERI's main clients, who confirm that venting was the common practice at KERI, are presented: '8.10a_VentConfirm(HyundaiHeavyIndustries)'	On 9 June 2010, DNV performed another site visit audit upon request of the PP as part of the validation process. During the site visit DNV interviewed KERI's engineers and they explained that KERI is the only institute in Korea which can conduct the test for high voltage and high capacity GCB and GIS. The claim was backed with the website of KOLAS (Korea Laboratory Accreditation Scheme; www.kolas.go.kr). DNV has verified the evidences presented by the PP and found them satisfactorily and sufficient as a response to the issue raised. CL closed

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		'8.10b_VentConfirm(Hyosung)' '8.10c_VentConfirm(LS Industrial Systems)' Discussed during the validation visit. DNV expressed concerns that 'Linde Korea' is another SF_6 manufacturing facility in Korea. Mr Dae-jun Han (SFK) explained that Linde Korea is not a SF_6 producer in Korea. He mentioned that although some companies look like SF_6 producers, in reality they only have purification facilities for "e" grade SF_6. This means that they firstly have to buy technical SF_6 from the SF_6 producers like from Solvay, Honeywell, AGC, or some Chinese and Russian companies who are the real SF_6 producers in the world. For example, the brochure from the Dilo/Solvay/Linde SF_6 reclamation program in the USA shows that Linde is an SF_6 distributor, not a producer ("8.14 Solvay, DILO, Linde - SF6 reuse brochure.pdf"). Since reclamation of used SF_6 to technical grade SF_6 can only take place at an SF_6 manufacturing facility, SFK is the only location where this could be introduced in Korea. In the "Korea Chamber of Commerce & Industry", SFK is the only listed SF_6	

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		producer in Korea. The list can be found in the link, http://www.korchambiz.net/ENG/search/searchTotal.jsp?cgiid=0&qry=SF6. List of SF_6 production facilities can be found in the link http://www.korchambiz.net/ENG/search/searchTotal.jsp?cgiid=0&qry=SF6, the website of the Korea Chamber of Commerce & Industry (KCCI) which shows that SFK is the only SF_6 producer company.	
CL 49 The PP is requested to present also the benchmarks used for other similar projects for which Solvay S.A. has approved the corresponding investments in the recent years, as for example, the 59 946 979 000 KRW investment referred to as "OSF-S05001, Erection of a Fluor Site", and/or, the 250 000 000 KRW investment referred to as "OSF-N08003, Plant improvements" mentioned both in the budget approval sheet /49/	B.5.13	An internal document from SFK, signed by Mr. S.B. Choi, the plant manager, was provided, showing a benchmark higher than the one used for CDM, thus the benchmark and the results presented in the PDD financial analysis are conservative..	The PP has submitted an extract of SFK's internal guidelines and defintions for investment purposes where it is outlined the expectation of reaching a target of 15% on return on investment at the business unit leve, which as started in the response of the PP it is higher than the one used for the financial/sensistivity analysis of the CDM project activity /39/ DNV finds the response of the PP sufficient and reasonable. CL closed.
CL 50 The estimated 9.7 tonnes per year only based	B.2.7	As stated in the CL 32, CL 33 and CL 47 answers,	Based on the documents provided in the CLs mentioned in the response from the

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
on the recovery records for the period July 2008 to March 2009. More used SF_6 could be recovered if more equipment was tested at KERI but there is no indication of such link as modern GIEEs tend to use less SF_6 to comply with the demands of end users. Thus, the only controlling and limiting here is Solvay's capacity to process more contaminated gas (since neither Solvay nor KERI control how the volume of contaminated gas to be processed by the project activity). From that perspective, present and substantiate the effect of using the maximum possible reclamation rate at Solvay's facilities.			PP, DNV has verified that the design capacity of SFK production facilities is 1500 ton/yr, from which the reclamation of the used SF_6 takes a small percentage, less than 5% (based on the data collected for 2009). Furthermore, the amount of used SF_6 gas reclaimed is entirely dependent on the business needs of KERI's customers, namely, testing of high and ultra-high voltage equipment, a factor which out of any influence from the PP. Finally, considering also the cap set to the amount of used SF_6 gas reclaimed (5% of total capacity), DNV is able to confirm that a maximum possible reclamation rate of more than 5% is very unlikely event outside of the PP control and that there would furthermore be a cap in such an ulikely event. CL closed.
CL 51 DVR-Estimation of GHG emissions/ Sub-step 1(a): Determine $V_{SF6,hist}$ (historical annual venting of SF_6): Expected concentration of SF_6 used gas varies	B.4.7	Both SF_6 concentrations came from the same source which is "6.1 start date recovery and reclamation report_02Jun08.pdf". The report covers 8 cylinder-bundles recovered between 02 June 2008 and 12 April 2009. As per the methodology, the concentration of	DNV has been able to verify the calculations presented by the PP in the response to the issue raised, and agrees that the values comes from the same source of information, and that difference is minimal/margnal to be considered, and it is due to the

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
among the references: 99.69% used in PDD references /15//34/ and 99.77% in the NPV analysis Correct and substantiate explanation accordingly. Also present/indicate the references to be removed/changed from the documents submitted.		SF_6 used in calculating the baseline should be the average concentration of SF_6 of the 50% of cylinder bundles that represent the most conservative (contaminated) measurements, which is equal to 99.69%. In calculating the NPV analysis, the average of all 8 cylinder bundles were used, resulting to 99.77%, since the financial analysis covers all the recovery/reclamation that occurred within the year. Change is also marginal if 99.69% instead of 99.77% is used in the NPV analysis, NPV results to only 0.04% increase (from -USD 446,709 to -USD 446,884)	calculation process: for the emission reduction calculations, average concentration of the 50% most contaminated measurements, versus the consideration of all measurements (8) in the calculation of the NPV. DNV find the response of the PP reasonable and sufficient enough to address the issue raised. CL closed.
CL 52 PP is requested to present evidence of the lifetime of the gas spectrometer	C.1.2 C.1.3	The lifetime of spectrophotometer is not available in the equipment manual. It was applied a depreciation period of 5 years, as presented in the answers to CL36, and because of it the financial analysis considered a re-investment every 5 years. Even if there is no re-investments every 5 years, and the equipment may last longer (e.g. 20 years, as stated in an e-mail from manufacturer), the financial analysis of this project would remain negative.	Although the PP was not able to obtain evidence from the lifetime of the gas spectrometer, the analysis made for a lifetime of 20 shows that such scenario will still result in that the project activity without CDM benefits remains financially unattractive. CL closed
CL 53 Although in the response of CL1 it was presented evidence (‘8.1 Onsan 2008	B.6.20	Please refer to CL30 for further details regarding the installed capacity of the plant.	DNV has been able to verify that the documentation provided in CL30 (“8.18 SFK_plant capacity”) describes among

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
Production summary-CONFIDENTIAL') for the 1 009.4 tonnes of production, still remains to be demonstrated that the production capacity of Solvay's plant is 1 500 tonnes of SF_6 per year. The corresponding evidence precisely referenced shall also be presented for validation			other the design capacity of the SFK plant to be 1 500 tonnes/year of SF_6. CL closed.
CL 54 From the sensitivity analysis in the PDD: "Project revenues come from the savings on raw materials (sulphur and AHF) and energy (electricity and steam), achieved by injecting used SF_6 rather than producing it from raw materials. The project activity does not result in an increase in production capacity at Solvay plant and hence there is no revenue from additional SF_6 production." PP shall demonstrate this statement and present the precise evidences to substantiate it.	B.5.11 B.5.20	As explained in CL30, maximum theoretical SF_6 production capacity of the plant is 1500 tonnes/year which is the bottleneck of the process, after reclamation, thus, changes or increase in installed capacity is not expected. Also, reclamation process has been operating since June 2008 but there has been no increase in SF_6 production based on the 2009 SF_6 Production Report ("8.22 SFK_2009 SF6 Production Report"), SF_6 production is only 964.9 tonnes, much lesser than 1500 tonnes.	DNV has verified the evidences presented and found the explanation from the PP reasonable and sufficient. CL closed.
CL 55 PDD Annex 3: Present in a more explicit fashion which signals from the testing records, as well as their respective values and the limiting condition(s) (threshold level), are used as the basis for deciding the next step at each the 3 decision making points presented in the flowchart shown in Annex A of the	B.4.4	The PDD has been changed accordingly in Annex 3, and all the formulas used for decision making process, as well the parameters used as reference where transparently presented.	The PP has presented the calculations for the reconstruction of the baseline, following the procedure indicated in Annex A of the approved methodology AM0079version 02 (/3/). Extracts from the tables showing the process and results are included in the PDD Annex 3. However, AM0079 requires that "The

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
methodology			PDD shall describe the signals from the testing records that indicate when the conditions of the flow chart are fulfilled (to be used in the reconstruction), including the conditions that demonstrate that when a testing item needed to be repeated and when equipment was dismantled." This is "so that an external party could find the same resulting historical baseline if they were to review all the historical year testing records". Annex 3 of the PDD does currently not contain any information on under which conditions a testing item needs to be repeated. Further information needs to be included in the PDD on the limiting B.1.4conditions (threshold level) "so that an external party could find the same resulting historical baseline if they were to review all the historical year testing records". This CL (CL 55) continues under CL 56 below. CL closed.
CL 56 Annex 3 of the PDD does currently not	B.4.4	Annex 3 has been revised accordingly to address CL 55. The step by step of	The revised version of the PDD version 3.4 dated 16 July 2010 includes in

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
contain any information on under which conditions a testing item needs to be repeated. Further information needs to be included in the PDD on the limiting conditions (threshold level) "so that an external party could find the same resulting historical baseline if they were to review all the historical year testing records".		Annex A was described, as well as all the signals and conditions to fill each of the Annex A requirements. With the current description, any party can replicate the analysis done for this PDD.	Annex 3 a step by step description how the baseline has been reconstructed from the historical test records. CL closed

Table 4 Forward action requests

Forward action request	Reference to Table 2	Response by project participants
FAR 1 The layout of the related equipment/infrastructure at the recovery site (at KERI's facilities) should be improved to ensure the integrity of the system	A.2.6	On the ground actions to improve layout will be implemented and verified at verification of the CDM project.
FAR 2 All piping connections into the container with the compressor shall be removed (e.g. connection labelled TC-35)	A.2.6	TC-35 will be removed, to be verified at verification of the CDM project.
FAR 3 A valve shall be installed at the end of the hose opposite to the container/room for the compressor, for the outside recovery point, to avoid leaking the gas left in the hose.	A.2.6	Valve will be installed, to be verified at verification of the CDM project.
FAR 4 The CDM Project documentation used in the laboratory in the reclamation site (SFK facilities) shall be kept separately from those documents related to the standard production of SF_6 gas from raw materials.	A.2.6	CDM gas analysis records will be kept separately at the SFK lab, to be verified at verification of the CDM project.
FAR 5 During the successive verifications it shall be confirm that issuance requests is formulated for periods of at least one year, as the procedures to remove the possibility of gaming are designed on a yearly basis.	A.2.6	The issuance request will be formulated for periods of at least one year in order to remove the possibility of gaming

Forward action request	Reference to Table 2	Response by project participants
FAR 6 During the first verification it shall be confirmed that the proper procedures are in place and the personnel involved in the CDM project activity properly trained to ensure both: that they are familiar with those procedures highly infrequent to occur (e.g. incineration of highly contaminated used gas, and its corresponding reporting), and that KERI's customer are properly assisted by KERI's personnel, such that KERI's customers are able to perform properly those tasks included in the CDM project activity involving both the SF6 gas and their own GIEE equipment	A.2.6	SOPs for how to guide the customer's personnel to ensure compliance with the requirements of the project activity will be implemented and verified at the first verification of the CDM project.

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APPENDIX B

CURRICULA VITAE OF THE VALIDATION TEAM MEMBERS

Michael Lehmann

Michael Lehmann holds a Master Degree in Environmental Sciences with a specialisation in environmental chemistry. He has an overall working experience of around 13 years.

Since 1999 he has worked in the climate change field and has closely followed the international response to the climate change challenge (UNFCCC, Kyoto Protocol) and the responses by national governments (EU ETS, UK ETS) and business. He has managed the validation and verification of many CDM and JI projects and thas carried out the technical review of numerous climate change project validations and verifications. Through his extensive work with validation and verification of CDM and JI projects, he has aquired sectoral competence within energy generation from renewable energy sources, electricity distribution, waste handling and disposal and animal waste management.

He has also experience with verifying corporate greenhouse gas emissions and emission reductions from verifying the emissions of the Norwegian process, paper & pulp and oil & gas industry.Earlier, he has managed DNV Research's R&D activities with the objective to build and to enhance DNV's knowledge in the field of CO2 capture and storage. He also conducted R&D to conclude on measuring systems and reporting formats necessary to accurately and trustworthy report greenhouse gas emission reductions, especially addressing uncertainties. He also provided technical environmental advisory services to clients within the process industry, above all in the field of air emissions. Among others, he developed a methodology for Environmental Risk Assessment for accidental releases of chemicals.

Seung Hyun Kwak

Seung Hyun Kwak holds MBA and Bachelor in Environmental Engineering. He is experienced in Environmental & Safety engineering and management system.

His experience also covers the validation and verification of CDM projects as well as Corporate GHG Inventory Verification. It aslo includes in internal audit of Environmental Management System as well as Safety Management system.

Chun Nan Lin

Chun Nan Lin holds a Bachelor Degree in Chemical Engineerign, and a Master and a Doctor Degrees in Environmental Engineerign. His experience includes eight years working in the semi-conductor industry. He participated in planning and implementing of the GHG reduction program to achieve Taiwan Semiconductor Industry Association reduction goal. Reduction plan includes abatement, substitution and process optimization. As part of this work, he also worked with handling SF6.

Kumaraswamy Chandrashekara

Kumaraswamy Chandrashekara holds a Bachelor's Degree in Chemical Engineering and has an overall experience of around 24 years. Prior to joining DNV, has worked for 11 years in the Chemical Process Industry covering Plant Operations, Technical Services and Process Design activities, primarily in the fertilisers and chemicals manufacturing sector. During this tenure of 11 years in the industry, responsibilities included production, process optimization, energy efficiency improvements, environmental performance, process design, energy auditing and technical auditing.

He has experience of around six years in the validation and verification of numerous CDM projects both in India and abroad. His qualification, industrial experience and experience in CDM sufficiently demonstrate his sectoral competence in the areas of chemical process industries, energy generation from renewable sources and waste handling & disposal.

Francisco Chávez V.

Francisco Chavez V. holds a Technical Degree in Electricity, a Bachelor Degree in Engineering Physics with specialization in Thermodynamics and IT systems, and a Master Degree in Business Administration with special focus in Strategy, Leadership, Marketing and Project Management. He has an overall working experience of around 27 years. Prior to joining DNV having 10 years experience in hydro power and renewable energy projects, electricity systems (transmission, distribution, supply, demand, generation and rural electrification) and electricity markets, electrical equipment and installations, and 10 years of experience within the oil and gas industry, and around 5 years of business experience in several areas. During these years he has covered the areas of: Project Management, Manufacturing, Supervision, Consultancy and Advisory services, Research and Testing of prototype equipment, and Field, Maintenance and Repair work, among other.

He has experience of around 2 years in validation and verification of CDM projects/JI and other 3rd party validation/verification services. His qualification, industrial experience and experience in CDM demonstrate him sufficient sectoral competence in: Energy generation from renewable energy sources, electricity distribution, Energy demand, Manufacturing of electrical equipment, and Oil and Gas industry.

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