

**MONITORING REPORT FORM (F-CDM-MR)****Version 02.0****MONITORING REPORT**

<b>Title of the project activity</b>	Point of Use Abatement Device to Reduce SF6 emissions in LCD Manufacturing Operations in the Republic of Korea (South Korea)
<b>Reference number of the project activity</b>	3440
<b>Version number of the monitoring report</b>	1
<b>Completion date of the monitoring report</b>	25/05/2012
<b>Registration date of the project activity</b>	10/07/2010
<b>Monitoring period number and duration of this monitoring period</b>	6 <sup>th</sup> Monitoring period ,and 2 months(01/02/2012 - 31/03/2012)
<b>Project participant(s)</b>	LG International Corp. LG Display., Ltd. Climate Change Capital Carbon Fund II s.a.r.l.
<b>Host Party(ies)</b>	Republic of Korea
<b>Sectoral scope(s) and applied methodology(ies)</b>	(4) Manufacturing industries (11) Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride “Point of Use Abatement Device to Reduce SF6 emissions in LCD Manufacturing Operations” Approved baseline and monitoring methodology AM0078 v.1.1 “Combined tool to identify the baseline scenario and demonstrate additionality.” v.2.2 “Tool to calculate the emission factor for an electricity system.” v.2 “Tool to calculate baseline, project and/or leakage emissions from electricity consumption.” v.1 “Tool to calculate project or leakage CO2 emissions from fossil fuel combustion.” v.2 “Guidelines for objective demonstration and assessment of barriers” EB50 Annex 13 “Guidelines on the assessment of investment analysis” EB51 Annex 58
<b>Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD</b>	162,745 (tCO <sub>2</sub> e)
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period</b>	226,806 (tCO <sub>2</sub> e)

**SECTION A. Description of project activity****A.1. Purpose and general description of project activity**

&gt;&gt;

LG Display (LGD) currently uses SF<sub>6</sub> in its LCD manufacturing process in Plant 2/3, Plant 4/5, Plant 6 in Gumi, South Korea and Plant 7 in Paju, South Korea. To destroy much of the SF<sub>6</sub> vented from the dry etching process, LG International (LGI) and LGD installed an abatement device at the stack of the dry etching chambers in Plant 6. And additional abatement device which has similar technical specifications with the existing system was installed in the plant 7 in Paju in late January 2012.

The project activities during this monitoring period includes Plant 6 and 7, and the other Plants mentioned in the registered Project Designed Document will be included from the subsequent monitoring period or thereafter depending on the investment timeline of each abatement system. The emission reductions achieved during this monitoring period comes from the abatement system in Plant 6 and 7 and, therefore, all information provided in this report is limited only to those of the existing system in Plant 6 and 7.

To decompose SF<sub>6</sub> gas, high temperature, around 1,200 °C, is necessary and diverse continuous measurements on both inlet and outlet are required to ensure accurate and reliable monitoring outcomes of emission reductions. For this purpose, an end-of-pipe abatement device was selected. And, In order to capture the actual amount of SF<sub>6</sub> entering and subsequently leaving the abatement device, the project participants have been undertaking an extensive ongoing monitoring operation. This monitoring operation includes installing and maintaining Fourier Transform Infrared (FTIR) devices on both the inlet and the outlet of the abatement device to continuously monitor the concentration of SF<sub>6</sub> and calculate the mass of SF<sub>6</sub> destroyed. In addition, two sets of Quadrupole Mass Spectrometer (QMS) were installed to calculate accurate values of dry molecular weights of both the inlet and the outlet gases as the applied methodology requires. This result has been converted into a carbon equivalent value and any emissions resulting from electricity and/or fuel consumption of the abatement device has been subtracted to arrive at the emission reduction value for the project activity.

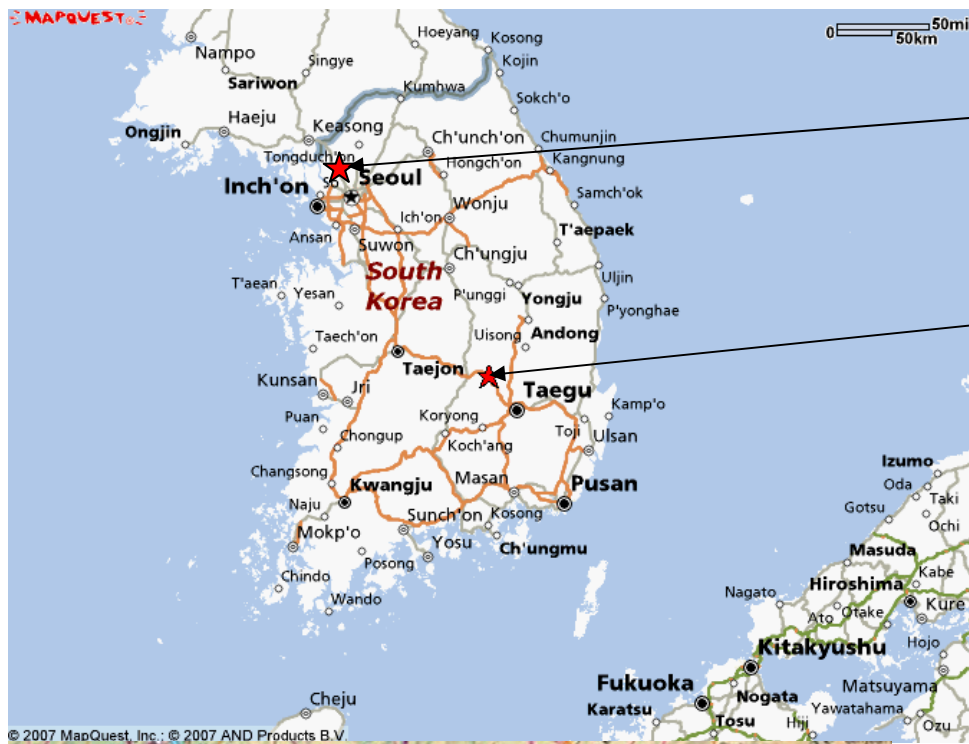
The following information contains dates of key events of the project

Date	Progress
February 13, 2009	The applied methodology, developed by the project participants, was approved by the CDM EB.
June 1, 2009	An EPC contract was signed and construction was commenced.
July 10, 2010	The project was approved by the CDM EB
July 23, 2010	The commissioning of the abatement system was completed.
August 1, 2010 ~	The crediting period of the project was started and operation was commenced.
May 24, 2011	An EPC contract for a new abatement system to be installed at P7 was signed.
June 22, 2011	CDM EB approved the 1 <sup>st</sup> monitoring report and issued CERs.
August 29, 2011	CDM EB approved the 2 <sup>nd</sup> monitoring report and issued CERs.

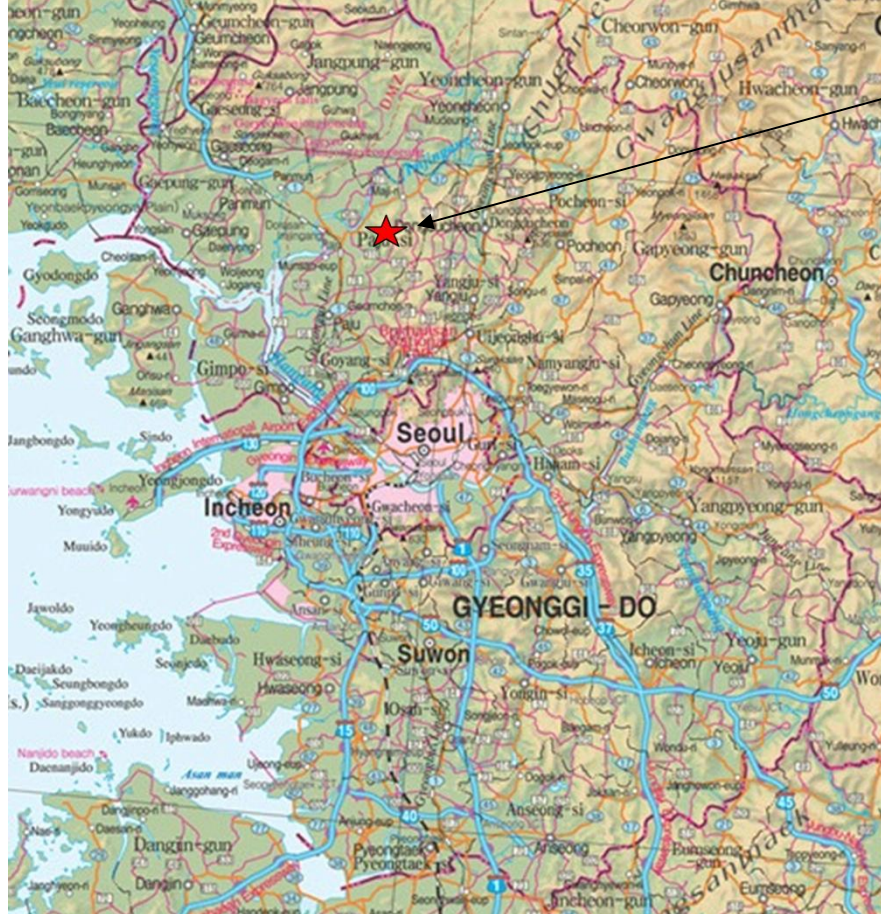
**A.2. Location of project activity**

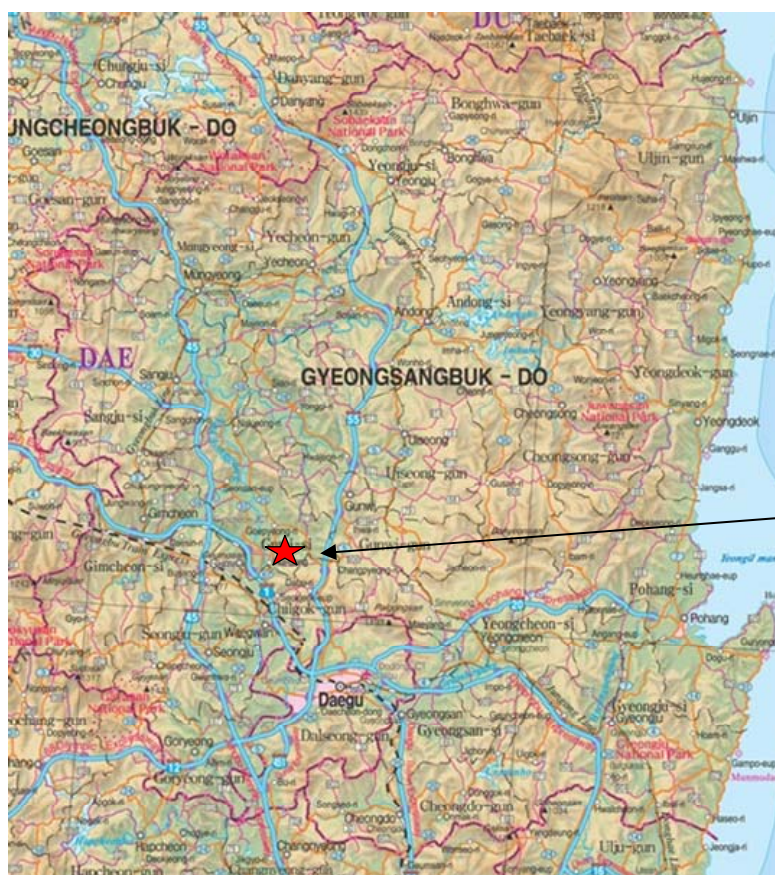
&gt;&gt;

The Plant 6 is based in Gumi which is located in the western part of Korea's North Gyeongsang Province, 277.5 km. south of Seoul and 167 km. north of Busan and Plant 7 is located in Paju, Gyeonggi Province, 50 km. west of Seoul. .



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Plant 6  
Gumi, Gyeongsangbuk-

### A.3. Parties and project participant(s)

Party involved (host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Republic of Korea (host)	LG International Corp. LG Display Co.,Ltd.	No
United Kingdom	Climate Change Capital Carbon Fund II s.a.r.l.	No

### A.4. Reference of applied methodology

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“Point of Use Abatement Device to Reduce SF6 emissions in LCD Manufacturing Operations”

Approved baseline and monitoring methodology AM0078 v.1.1

“Combined tool to identify the baseline scenario and demonstrate additionality.” v.2.2

“Tool to calculate the emission factor for an electricity system.” v.2

“Tool to calculate baseline, project and/or leakage emissions from electricity consumption.” v.1

“Tool to calculate project or leakage CO2 emissions from fossil fuel combustion.” v.2

“Guidelines for objective demonstration and assessment of barriers” EB50 Annex 13

“Guidelines on the assessment of investment analysis” EB51 Annex 58

### A.5. Crediting period of project activity

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August 1, 2010 – July 31, 2020 (Fixed)

The starting date of the crediting period has been changed from July 10, 2010 to August 1, 2010 following the project participants' request made on July 22, 2010. The request was sent to the UNFCCC secretariat and subsequently accepted.

## SECTION B. Implementation of project activity

### B.1. Description of implemented registered project activity

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The commissioning of the abatement device installed in Plant 6 was completed on July 23, 2010 and has been operational since August 1, 2010. The second investment for a new SF<sub>6</sub> abatement system to be installed in Plant 7 was approved by the executives in March, 2011 and an EPC contract was signed on 24 May, 2011. The construction was completed in January, 2012, and it started to generate ERs from February, 2012. Commercial orders for additional sets of abatement devices to be installed in other than plant 6 and 7 are yet to be made at the time of writing. As the project participants described in the registered PDD, the other plants will be successively invested after the performance of the existing abatement system has been confirmed.

And the followings are information on special events including overhaul times, downtimes of the system and exchange of any equipment. (Any replacement works of the consumables are excluded.)

[Plant 6 in Gumi]

Events	Date	Duration	Effects on emission reduction
Replacement of outlet FTIR vacuum pump	Feb. 10 2012	40 seconds (13:49:20~13:50:00)	The pad of FTIR vacuum pump is the consumable part. When operators inspected on a site, he heard abnormal sound from the outlet FTIR vacuum pump. He immediately replaced it with new one on ready. It is a precautionary measure in worries over that its pad might get damaged. Even if its pad got severely torn, required pressures for proper sampling would be kept steady because the pad could even work well in that case. Also, no leakage happened since the vacuum pump was tightly sealed. All emission reductions during this event were manually deleted from the ER calculation.
Operation under reduced LNG consumption on purpose	Feb. 23 2012	3 hours 32 minutes (08:58~12:30) (15:25~24:00)	From the beginning of February, inlet SF <sub>6</sub> concentration was found to get lowered since production of LGD display panels was reduced as planned. In this circumstance, we did not need to maintain a reactor temperature over 1,200oc business as usual, which is optimized to destroy relatively high SF <sub>6</sub> concentration (over 300ppm). In an effort to save operating costs, we lowered a reactor temperature around 1,000oc, which was still enough to destroy the temporarily lowered inlet SF <sub>6</sub> concentration at that time. Accordingly, LNG consumption was also reduced. However, since this reduced LNG consumption was
	Feb. 24 2012	24 hours (00:00~24:00)	
	Feb. 25 2012	19 hours 30 minutes (00:00~19:30)	



	Feb. 26 2012	24 minutes (15:25~15:49)	deviated from the normal one, our calculating process for emission reduction automatically named it as a no good value. As a result, no emission reductions could be generated during the events.
Data analyzing computer error	Feb. 17 2012	2 minutes 8 seconds (19:40:04~19:42:12)	There was a minor error in running CIMON X program in the data monitoring computer. However, it was corrected by simply re-booting the computer. All reductions during this event were not automatically counted at all.
	Feb. 18 2012	34 seconds (09:54:40~09:55:14)	
	Feb. 20 2012	2 minutes 7 seconds (22:51:07~22:53:14)	
	Mar. 3 2012	2 minutes 3 seconds (16:13:58~16:16:01)	
Outlet FTIR performance check	Mar. 7 2012	66 minutes 16 seconds (11:40:25~12:22:57) (13:19:12~13:42:56)	DOE requested us to conduct on-site Zero-span check with N2 gas for testifying to outlet FTIR's performance when they were scheduled to have a site visit on 8 <sup>th</sup> March. As a preparation measure for the request, we had tested Outlet FTIR performance through Zero-span check in advance on 7 <sup>th</sup> March, a day before the DOE's site visit. During the time period of the FTIR performance check for these two days, emission reductions were not counted at all.
	Mar. 8 2012	14 minutes 14 seconds (11:26:28~11:40:42)	

The above events have not had any adverse effects on the applicability of the applied methodology and no other event which may impact the applicability of the methodology has occurred during the monitoring period.

[Plant 7 in Paju]

Events	Date	Duration	Effects on emission reduction
Data analyzing computer error	Feb. 1 2012	44 minutes 18 seconds (01:32:03~02:16:21)	There was malfunctioning in Trend PC. During this event, any raw data was not recorded at all. Accordingly, it couldn't be restored afterwards, so emission reductions for this time period were not able to be generated
	Feb. 7 2012	11 minutes 28 seconds (07:04:54~07:16:17) (13:46:17~13:46:22)	
	Feb. 18 2012	10 minutes 21 seconds (01:01:01~01:11:22)	
	Feb. 25 2012	26 minutes 20 seconds (11:16:31~11:42:51)	
	Mar. 23 2012	51 seconds (16:04:33~16:05:24)	
Frozen line of the inlet FTIR	Feb. 1-2 2012	20 hours 5 minutes (12:55:00~23:59:59) (00:00:00~08:59:59)	The Inlet FTIR line was frozen, so concentration of SF6 was not properly measured. This abnormal measurement was found at graphic representation. We took out all the data during this time period in



			a conservative manner. And, after replacing the frozen line with brand new one, measurement of inlet SF6 concentration could be back on the right track. It can be proved from taking a look at its graphic representation. Without a doubt, emission reductions for this time period were not able to be generated
Transmission error of LNG signals	Feb. 3 2012	1 minute 13 seconds (01:49:28~01:50:41)	Abnormal LNG signals were represented, while being deviated from plus & minus 5 % ranges of business-as-usual values. It might be caused by its digital transmission system, in which its temperature and pressure values were collided with each other, so overall the LNG signals were turned out to be abnormal. All reductions during this event were not automatically counted at all.
	Feb. 5 2012	59 seconds (15:57:27~15:58:26)	
	Feb. 10 2012	1 minutes 58 seconds (05:41:15~05:42:14) (06:01:01~06:02:00)	
	Feb. 13 2012	59 seconds (10:53:13~10:54:12)	
	Feb. 16 2012	59 seconds (11:40:55~11:41:54)	
	Feb. 17 2012	59 seconds (15:12:09~15:13:08)	
	Feb. 20 2012	59 seconds (07:40:52~07:41:51)	
	Feb. 21 2012	58 seconds (02:39:06~02:40:04)	
	Feb. 23 2012	59 seconds (06:01:03~06:02:02)	
	Feb. 28 2012	1 minutes (07:14:28~07:15:28)	
	Mar. 20 2012	58 seconds (03:52:31~03:53:29)	
	Mar. 30 2012	59 seconds (10:28:29~10:29:28)	
	Mar. 31 2012	1 minute 3 seconds (17:34:15~17:35:18)	
Deviated inlet volumetric flow rate and its stack gas velocities	Feb. 7 2012	2 minute 51 seconds (10:56:15~10:59:06)	Due to maintenance check on LGD main damper, which connects LGD production line with SF6 abatement system line, inlet volumetric flow rate and its stack gas velocities were temporarily deviated from its business-as-usual values. When these were off the permitted range, emission reductions were not automatically counted at all.



	Feb. 14 2012	33 minute 29 seconds (15:23:40~15:57:09)	Due to replacement work of C/R scrubber gasket in the south of LGD TFT-1, inlet volumetric flow rate and its stack gas velocities were temporarily deviated from its business-as-usual values. When these were off the permitted range, emission reductions were not automatically counted at all.
Stabilization work on Trend PC system	Feb. 27 2012	17 minute 21 seconds (16:19:55~17:37:16)	To loose Trend PC's transmission workload, its transmission interval (from Trend PC to Data PC) was changed from 0.7 second to 1 second. In addition, transmission interval from LNG receiving set to the Trend PC was also changed from 0.3 second to 0.7 second. For this time period, emission reductions were not able to be generated.
Trend PC data backup	Feb. 27 2012	30 minute 8 seconds (21:07:21~21:37:29)	Trend PC was turned off, while its data backup was on the process. For this time period, emission reductions were not able to be generated.
Replacement of LNG transmission LAN module	Feb. 28 2012	7 hours 21 minutes 27 seconds (11:05:44~18:27:11)	In an effort to tackle abnormal signal issues of LNG, which happened quite often recently for such a short period of time as 1 minute, its transmission lan module and its compensator module for temperature and pressure were replaced with new ones. For this time period, emission reductions were not able to be generated.
Malfunction of Inlet FTIR analyzing program	Mar. 7 2012	48 minutes 14 seconds (15:08:10~15:56:24)	Due to malfunction of inlet FTIR analyzing program (AQpro), which might be caused by its system overload, SF6 concentrations were not be scanned appropriately. Thus, for this time period, emission reductions were not able to be generated.
Transmission error of Volumetric flow rate	Mar. 10 2012	32 seconds (03:27:48~03:28:20)	Using wireless communication device near Annubar panel was considered to be a main cause for triggering transmission errors of volumetric flow rate concerned. For this time period, emission reductions were not able to be generated.
QMS calibration and measuring molecular weights of gases	Mar. 15 2012	5 hours 31 minutes 55 seconds (18:28:05~24:00:00)	QMS was calibrated in order to have a new setting of molecular weights of gases following its authorized measuring rule of at least 6 hours continuous checking. The reason why we tried to have a new setting of molecular weights of gases was that we wanted to officially confirmed non-existence of over 100 ppm SO2F2 gas. Based on the methodology, any gas over 100 ppm should be added on the subject list for calculating molecular weights, but we had not applied SO2F2 gas to the subject list on the assumption that it was definitely under 100 ppm. This assumption was found to be true when we looked through all the data of over 6 hours checking. During this testing period, there was no SO2F2 gas over 100 ppm. It was a self-motivated testing for obeying the strict methodology. For all the testing time, ERs were not able to be generated at all.
	Mar. 16 2012	24 hours (00:00:00~24:00:00)	
	Mar. 17 2012	24 hours (00:00:00~24:00:00)	
	Mar. 18 2012	8 hours (00:00:00~08:00:00)	





Deviated outlet volumetric flow rate	Mar. 31 2012	20 minutes 39 seconds (05:11:21~05:32:00)	Outlet volumetric flow rate was fluctuated, and even deviated from its permitted ranges of plus & minus 5% to its business-as-usual value. When it was off the permitted range, emission reductions were not automatically counted at all.
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The above events have not had any adverse effects on the applicability of the applied methodology and no other event which may impact the applicability of the methodology has occurred during the monitoring period.

## **B.2. Post registration changes**

### **B.2.1. Temporary deviations from registered monitoring plan or applied methodology**

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No deviation has been made.

### **B.2.2. Corrections**

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None

### **B.2.3. Permanent changes from registered monitoring plan or applied methodology**

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None

### **B.2.4. Changes to project design of registered project activity**

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None

### **B.2.5. Changes to start date of crediting period**

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The starting date of the crediting period has been changed from July 10, 2010 to August 1, 2010 following the project participants' request made on July 22, 2010.

### **B.2.6. Types of changes specific to afforestation or reforestation project activity**

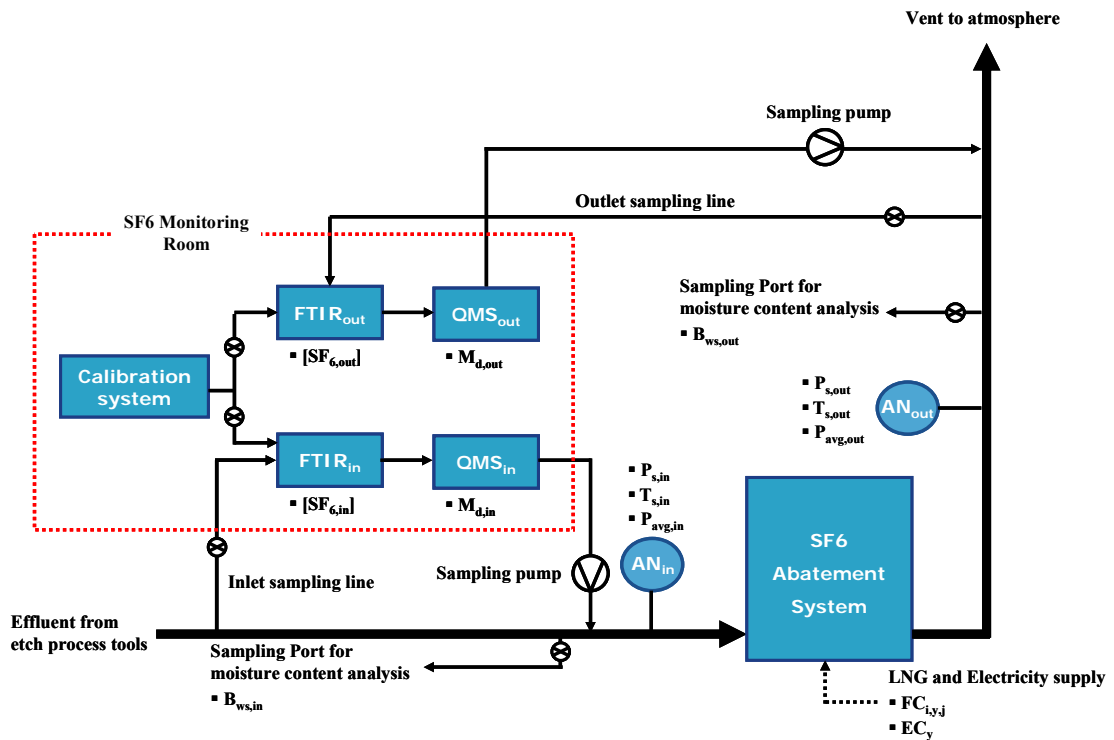
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None

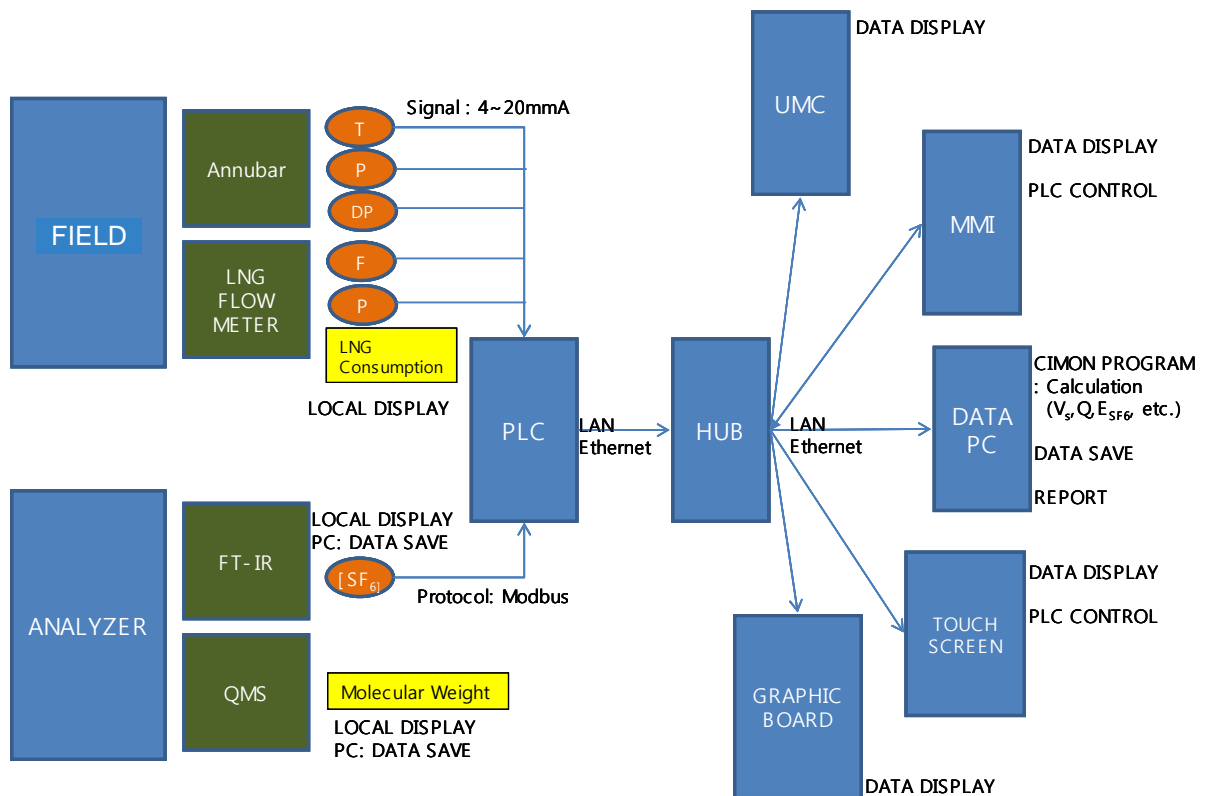
## **SECTION C. Description of monitoring system**

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Parameters used in the emission reductions calculation can be classified into 4 groups – continuously monitored group, frequently monitored group, calculated group and externally provided group. The following diagrams show all relevant monitoring points and how the continuously monitored factors and frequently monitored factors are gathered, processed, calculated, recorded and reported.



<Monitoring points>



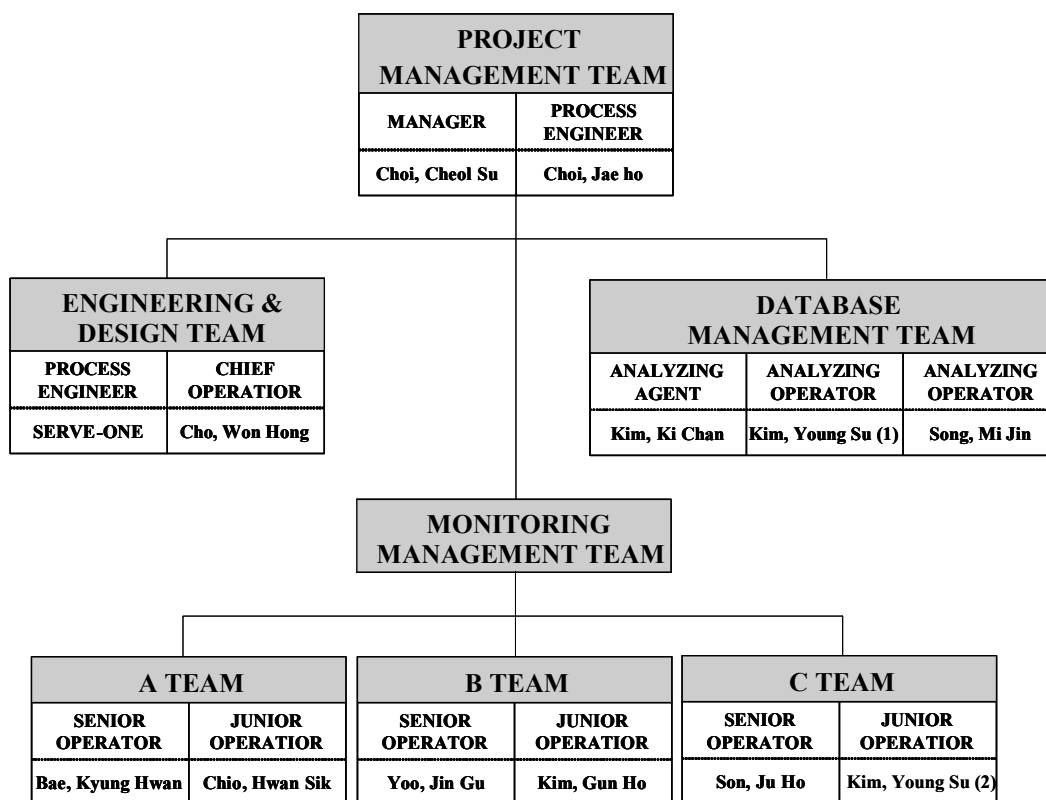
<Data Processing Flow>

The continuously monitored parameters including temperature, pressure, velocity head and concentration of SF6 in both inlet and outlet gases are measured by each metering device described in Section D.2. The

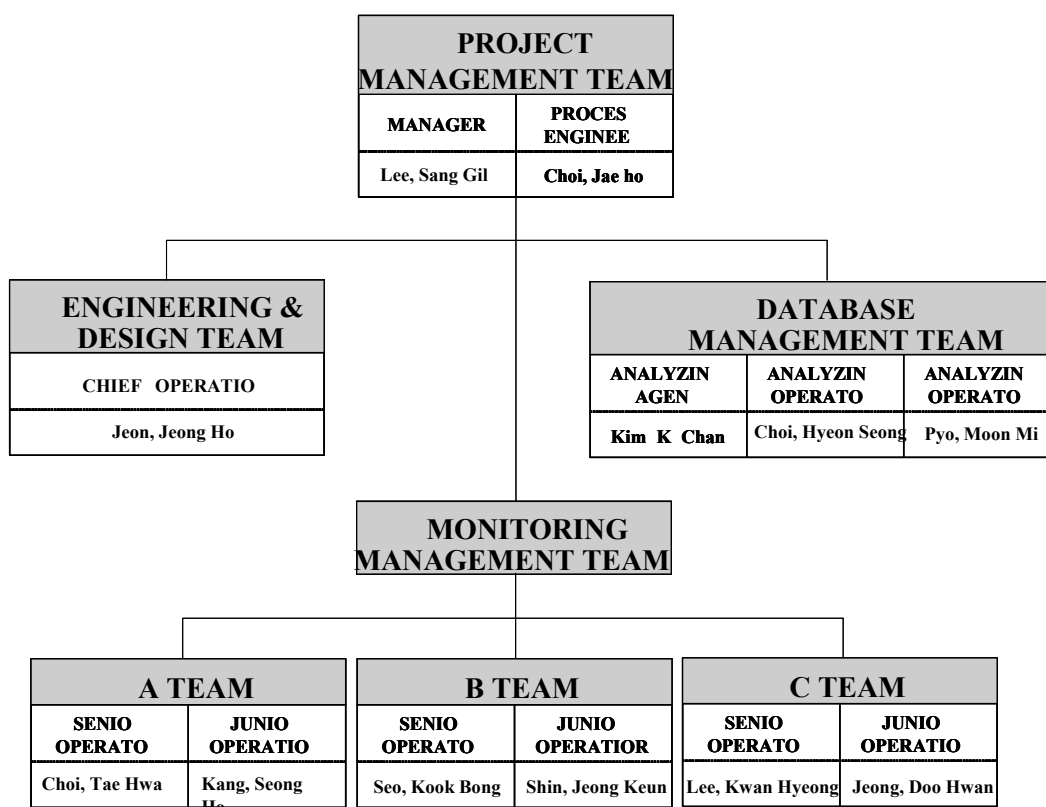
data is transmitted to PLC through electrical signal and subsequently distributed to other devices such as Main Monitoring Interface (MMI), Utility Monitoring Center (UMC) and computers to control the whole system and to calculate emission reductions. The emission reduction is calculated by the data processing program and the results are recorded along with other raw data on server computers. The result is reported to the project participant by the operation team on daily, weekly and monthly bases. In case of the externally provided group, the project participants secured accuracy and transparency of data through diverse QA/QC activities. The activities include crosschecking with logbook/SAP data, invoice/letter from suppliers and other reliable measures.

The operation team consists of several sub-teams namely Project Management team, Engineering & Design team, Database Management team and Operation Management team. The following is an organizational structure of the operation team.

[Plant 6 in Gumi]



[Plant 7 in Paju]



Each sub team has following roles and responsibilities;

#### 1) Project Management team's roles and responsibilities

- Responsible for the overall legal affairs for SF6 decomposition facilities
- Secure operations of the SF6 decomposition facilities in accordance with the CDM methodology
- Secure and manage human resources necessary for operations of SF6 decomposition facilities
- Training practice and evaluation of each team member necessary for operations
- Amicable performance over operations of the facilities in cooperation with managers of LG
- Check and supervision over operating conditions for SF6 decomposition facilities
- Responsible supervision for calibrations of metering devices and supervision for suppliers

#### 2) Engineering & Design team's roles and responsibilities

- Designer for the overall operations for SF6 decomposition facilities
- Maintain the proper operating conditions and performance for SF6 decomposition facilities
- Risk management for operations of SF6 decomposition facilities
- System design in accordance with the methodology
- Improvements on equipments for SF6 decomposition facilities and system

#### 3) Database Management team's roles and responsibilities

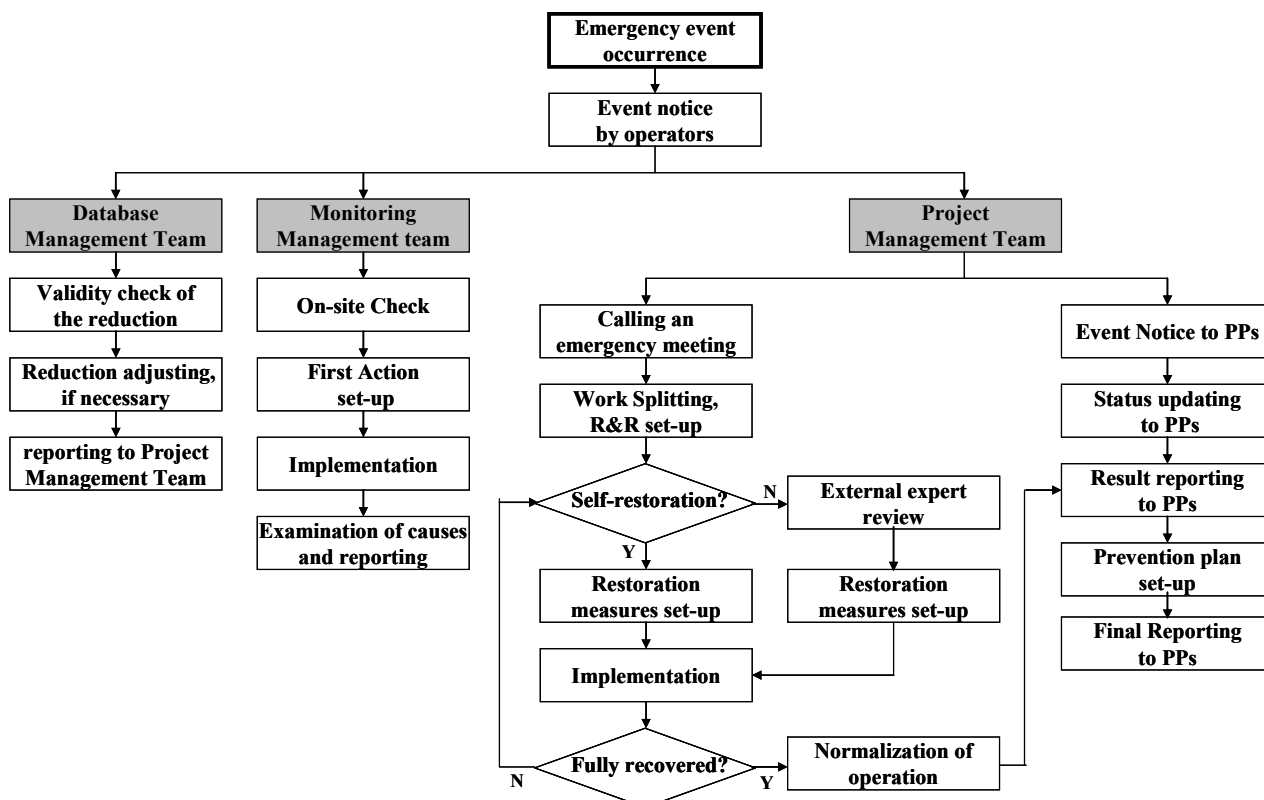
- Actual operator of SF6 decomposition facilities
- Data monitoring and record required in the methodology
- Establish alarm values and monitor them
- Regular check on SF6 decomposition facilities

#### 4) Monitoring Management team's roles and responsibilities

- Data measurement and storage necessary for the methodology
- Store measurement data for 2 years after the last credit period

- Calibration of metering device and reporting of calibration results
- Maintenance/repair and report of metering devices
- Accuracy check and result report for measurements
- Check and troubleshooting on any alarm from metering devices
- Daily/weekly/monthly report for measurement data
- Auditing for calibration works on metering devices

The operation team has set up emergency plans for the main system and metering devices. When emergency events occur, the following emergency procedure will be applied.



More detailed information on monitoring system is included in a Data Management Manual which has been provided to DOE for verification purpose.

## SECTION D. Data and parameters

### D.1. Data and parameters fixed ex ante or at renewal of crediting period

Data/Parameter	GWP of SF <sub>6</sub>
Unit	tCO <sub>2</sub> eq/tSF <sub>6</sub>
Description	Global Warming Potential of SF <sub>6</sub>
Source of data	IPCC default value
Value(s) applied	23,900
Purpose of data	This data is used for the baseline calculation.
Additional comment	Provided by the IPCC to calculate the global warming potential of SF <sub>6</sub>



Data/Parameter	Design capacity for existing Abatement Device ( $CAP_{SF6, ex}$ )
Unit	Tonnes/year
Description	Design capacity should be based on the maximum flow allowed for normal operation of abatement device, based on the assumption that the existing abatement device is operating at full design capacity for the entire period of the year (i.e. 8760 hours).
Source of data	Historic operation design of existing plants
Value(s) applied	None- Not applicable
Purpose of data	This data is used for the baseline calculation.
Additional comment	There is no abatement device on the existing lines of production or plants included in this project.

Data/Parameter	Historical SF <sub>6</sub> consumption ( <i>CSF6,hist</i> )																							
Unit	Tonnes																							
Description	Historical SF <sub>6</sub> consumption of Plant 6 & 7, calculated as the three years maximum consumption prior to the implementation of the project activity before 31 January 2009. Consumption is defined as the total SF <sub>6</sub> purchased in a year, taking into account the change in inventory in a specific year.																							
Source of data	Record of purchase and inventory																							
Value(s) applied	<p>P6: 12,496 tonnes, P7: 16,140 tonnes This value is the maximum consumption of SF<sub>6</sub> in Plant 6 &amp; 7 over the three year historic period.</p> <table><tr><th rowspan="2">Fab</th><th colspan="3">Yearly SF6 consumption (kg)</th></tr><tr><th>'06</th><th>'07</th><th>'08</th></tr><tr><td>P6 (in the PDD)</td><td>55,024</td><td>73,990</td><td>76,226</td></tr><tr><td>P7 (in the PDD)</td><td>24,371</td><td>70,092</td><td>98,453</td></tr><tr><td>P6 (adjusted)</td><td>9,045</td><td>12,163</td><td>12,496</td></tr><tr><td>P7 (adjusted)</td><td>4,006</td><td>11,522</td><td>16,140</td></tr></table> <p>For this monitoring purpose, only 60 days of C<sub>SF6,hist</sub> is necessary. (The monitoring period, 01/02/2012 – 31/03/2012, is 60 days.) Therefore, the values presented in the PDD are re-calculated on a pro-rata basis.</p>	Fab	Yearly SF6 consumption (kg)			'06	'07	'08	P6 (in the PDD)	55,024	73,990	76,226	P7 (in the PDD)	24,371	70,092	98,453	P6 (adjusted)	9,045	12,163	12,496	P7 (adjusted)	4,006	11,522	16,140
Fab	Yearly SF6 consumption (kg)																							
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P6 (in the PDD)	55,024	73,990	76,226																					
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P6 (adjusted)	9,045	12,163	12,496																					
P7 (adjusted)	4,006	11,522	16,140																					
Purpose of data	This data is used for the baseline calculation.																							
Additional comment	-																							





<b>Data/Parameter</b>	Historical production of LCD substrate ( <b>SP-i</b> )																									
<b>Unit</b>	m2																									
<b>Description</b>	Historical production of LCD substrate (m2) of Plant 6 & 7 during year i (where i = -1, -2, -3) prior to the implementation of the project activity before January, 31, 2009 (values of 60 days, for this monitoring purpose)																									
<b>Source of data</b>	Production record																									
<b>Value(s) applied</b>	<table border="1"> <thead> <tr> <th rowspan="2">Fab</th><th colspan="3">Glass input(m2)</th></tr> <tr> <th>'06</th><th>'07</th><th>'08</th></tr> </thead> <tbody> <tr> <td>P6 (in the PDD)</td><td>4,078,800</td><td>5,252,354</td><td>5,680,338</td></tr> <tr> <td>P7 (in the PDD)</td><td>2,438,002</td><td>6,020,234</td><td>7,559,469</td></tr> <tr> <td>P6 (adjusted)</td><td>670,488</td><td>863,401</td><td>931,203</td></tr> <tr> <td>P7 (adjusted)</td><td>400,767</td><td>989,628</td><td>1,239,257</td></tr> </tbody> </table> <p>For this monitoring purpose, only 60 days of <math>C_{SF6, hist}</math> is necessary. (The monitoring period, 01/02/2012 – 31/03/2012, is 60 days.) Therefore, the values presented in the PDD are re-calculated on a pro-rata basis.</p>			Fab	Glass input(m2)			'06	'07	'08	P6 (in the PDD)	4,078,800	5,252,354	5,680,338	P7 (in the PDD)	2,438,002	6,020,234	7,559,469	P6 (adjusted)	670,488	863,401	931,203	P7 (adjusted)	400,767	989,628	1,239,257
Fab	Glass input(m2)																									
	'06	'07	'08																							
P6 (in the PDD)	4,078,800	5,252,354	5,680,338																							
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P6 (adjusted)	670,488	863,401	931,203																							
P7 (adjusted)	400,767	989,628	1,239,257																							
<b>Purpose of data</b>	This data is used for the baseline calculation.																									
<b>Additional comment</b>	-																									

<b>Data/Parameter</b>	<b>Maintenance schedule for abatement device</b>
<b>Unit</b>	List of maintenance requirements and checking frequency
<b>Description</b>	Complete maintenance schedule for the device
<b>Source of data</b>	Yearly plan of Operation & Maintenance team
<b>Value(s) applied</b>	A summary of this information has been submitted to the DOE for verification purpose.
<b>Purpose of data</b>	Not applicable
<b>Additional comment</b>	This data is not used for calculating emission reduction. However, reporting this data is required by the applied methodology.

<b>Data/Parameter</b>	<b>Maintenance schedule for FTIR measurement devices</b>
<b>Unit</b>	List of maintenance requirements and checking frequency
<b>Description</b>	Complete maintenance schedule for the device
<b>Source of data</b>	Yearly plan of Operation & Maintenance team
<b>Value(s) applied</b>	A summary of this information has been submitted to the DOE for verification purpose.
<b>Purpose of data</b>	Not applicable
<b>Additional comment</b>	<p>This data is not used for calculating emission reduction. However, reporting this data is required by the applied methodology.</p> <p>* Maintenance on the FTIR is regularly conducted in June every year on the occasion of AST (Annual Surveillance Test), even if there is no signal to malfunctioning. At his time, recalibration is carried out. The official supplier, Joowon Industrial Co., of the FTIR, does not request, or recommend cleaning and replacement of FTIR window at regular frequency.</p>



<b>Data/Parameter</b>	<b>Maintenance schedule for QMS measurement devices</b>
<b>Unit</b>	List of maintenance requirements and checking frequency
<b>Description</b>	Complete maintenance schedule for the device
<b>Source of data</b>	Yearly plan of Operation & Maintenance team
<b>Value(s) applied</b>	A summary of this information has been submitted to the DOE for verification purpose.
<b>Purpose of data</b>	Not applicable
<b>Additional comment</b>	This data is not used for calculating emission reduction. However, reporting this data is required by the applied methodology.

<b>Data/Parameter</b>	<b>Maintenance schedule for Annubar devices</b>
<b>Unit</b>	List of maintenance requirements and checking frequency
<b>Description</b>	Complete maintenance schedule for the device
<b>Source of data</b>	Yearly plan of Operation & Maintenance team
<b>Value(s) applied</b>	A summary of this information has been submitted to the DOE for verification purpose.
<b>Purpose of data</b>	Not applicable
<b>Additional comment</b>	This data is not used for calculating emission reduction. However, reporting this data is required by the applied methodology.

<b>Data/Parameter</b>	$EF_{grid,CM,y}$
<b>Unit</b>	tCO <sub>2</sub> /MWh
<b>Description</b>	Combined margin CO <sub>2</sub> emission factor for grid connected power generation using ex-ante option of three most recent years of available data for the OM and the most recent information available at the time of submission for validation to the DOE for BM.
<b>Source of data</b>	Values have been calculated using the “Tool to calculate the emission factor for an electricity system v.2”
<b>Value(s) applied</b>	0.5708 TCO <sub>2</sub> /MWh
<b>Purpose of data</b>	This data is used for the project calculation.
<b>Additional comment</b>	This data has been verified by the DOE which validated the project and will be used for the whole crediting period of the project.

<b>Data/Parameter</b>	$C_{p,in}$
<b>Unit</b>	dimensionless
<b>Description</b>	Pitot tubes or Averaging Pitot Tube coefficient of the inlet Annubar device
<b>Source of data</b>	Annubar device manufacturer specification
<b>Value(s) applied</b>	1
<b>Purpose of data</b>	This data is used for the project calculation.
<b>Additional comment</b>	



<b>Data/Parameter</b>	$C_{p,out}$
<b>Unit</b>	dimensionless
<b>Description</b>	Pitot tubes or Averaging Pitot Tube coefficient of the outlet annubar device
<b>Source of data</b>	Annubar device manufacturer specification
<b>Value(s) applied</b>	1
<b>Purpose of data</b>	This data is used for the project calculation.
<b>Additional comment</b>	

<b>Data/Parameter</b>	<b>Cross sectional area of the inlet stack (<math>A_{in}</math>)</b>
<b>Unit</b>	$m^2$
<b>Description</b>	The cross sectional of the circular inlet stack, which should be greater than 0.3 m in diameter.
<b>Source of data</b>	Supplier's specification
<b>Value(s) applied</b>	0.0961625
<b>Purpose of data</b>	This data is used for the project calculation.
<b>Additional comment</b>	0.175m * 0.175m*3.14 (Diameter of the inlet stack is 0.35m)

<b>Data/Parameter</b>	<b>Cross sectional area of the outlet stack (<math>A_{out}</math>)</b>
<b>Unit</b>	$m^2$
<b>Description</b>	The cross sectional of the circular outlet stack, which should be greater than 0.3 m in diameter.
<b>Source of data</b>	Supplier's specification
<b>Value(s) applied</b>	0.2826
<b>Purpose of data</b>	This data is used for the project calculation.
<b>Additional comment</b>	0.3m * 0.3m*3.14 (Diameter of the outlet stack is 0.6m)

## D.2. Data and parameters monitored

[Plant 6 in Gumi]



<b>Data/Parameter</b>	$E_{SF6,in,y}$
<b>Unit</b>	tonnes
<b>Description</b>	Mass of SF <sub>6</sub> gas entering the abatement device in year y (From February 1, 2012 to March 31, 2012, for this monitoring purpose.)
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	Data processing program and Daily/weekly/monthly logs
<b>Value(s) of monitored parameter</b>	3.7301 tonnes
<b>Monitoring equipment</b>	This value is a sum of daily $E_{SF6,in}$ values for the monitoring period. For the monitoring equipment information of $E_{SF6,in}$ , please refer to the $E_{SF6,in}$ table in this section.
<b>Measuring/Reading/Recording frequency</b>	Once per year or a monitoring period, whichever is shorter.
<b>Calculation method (if applicable)</b>	Sum of daily $E_{SF6,in}$
<b>QA/QC procedures</b>	Daily sum of $E_{SF6,in}$ value is automatically calculated by a data processing program and recorded in a daily log by operators. The log is double-checked by the head of O&M team and sum of weekly and monthly data are reported to the project participants periodically. More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.
<b>Purpose of data</b>	This data is used for the Baseline emission calculation
<b>Additional comment</b>	



<b>Data/Parameter</b>	$C_{SF6,y}$
<b>Unit</b>	Tonnes
<b>Description</b>	Annual consumption of SF <sub>6</sub> during the project year y, defined as the total SF <sub>6</sub> purchased in a specific project year y taking into account the change in inventory in the same year. (From February 1, 2012 to March 31, 2012, for this monitoring purpose.)
<b>Measured/Calculated /Default</b>	Calculated
<b>Source of data</b>	Purchase records, monthly records on SF <sub>6</sub> inventory change and cylinder replacement records.
<b>Value(s) of monitored parameter</b>	8.845 tonnes
<b>Monitoring equipment</b>	Not applicable
<b>Measuring/Reading/Recording frequency</b>	Once per year or a monitoring period, whichever is shorter.
<b>Calculation method (if applicable)</b>	(Total SF <sub>6</sub> purchase Amount – Inventory change) * 10% of heel value
<b>QA/QC procedures</b>	This data is cross-checked with official purchase records and inventory data is measured and recorded at the beginning and end of each month. Residual gas quantity (Heel value), which is smaller than 10%, is measured and recorded every replacement. The average value of the residual gas quantity during the monitoring period is 6.0%. However, for more conservative calculation, 10% of heel value is applied in the emission reduction calculation.
<b>Purpose of data</b>	This data is used for the baseline emission calculation.
<b>Additional comment</b>	

<b>Data/Parameter</b>	$SP_{project,y}$
<b>Unit</b>	m <sup>2</sup>
<b>Description</b>	Production of LCD substrate during the project year y (From February 1, 2012 to March 31, 2012, for this monitoring purpose.)
<b>Measured/Calculated /Default</b>	Measured
<b>Source of data</b>	Manufacturing Execution system of LG Display
<b>Value(s) of monitored parameter</b>	653,715 m <sup>2</sup>
<b>Monitoring equipment</b>	This data comes from the Manufacturing Execution System of LG Display, which is a computerized system commonly used in the manufacturing industry.
<b>Measuring/Reading/Recording frequency</b>	Once per year or a monitoring period, whichever is shorter.
<b>Calculation method (if applicable)</b>	Not applicable
<b>QA/QC procedures</b>	Cross check with LGD's monthly & annual production summary reports
<b>Purpose of data</b>	This data is used for the baseline emission calculation.
<b>Additional comment</b>	



<b>Data/Parameter</b>	$E_{SF6,in}$
<b>Unit</b>	Gram / second
<b>Description</b>	Emissions of SF <sub>6</sub> gas measured at the inlet of the SF <sub>6</sub> abatement system
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	From inlet QMS, FTIR and inlet Annubar devices
<b>Value(s) of monitored parameter</b>	Sums of the daily, weekly and monthly data of $E_{SF6,in}$ are recorded and reported.
<b>Monitoring equipment</b>	<p>0.74 gram / second</p> <p>This is the average value during the monitoring period.</p> <p>To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of <math>V_{s,in}</math>, <math>V_{s,out}</math>, <math>Q_{in}</math>, <math>Q_{out}</math>, <math>E_{SF6,in}</math> and <math>E_{SF6,out}</math> using each real-time value of <math>P_{s,in}</math>, <math>P_{s,out}</math>, <math>T_{s,in}</math>, <math>T_{s,out}</math>, <math>P_{avg,in}</math>, <math>P_{avg,out}</math> and SF<sub>6</sub> concentration and fixed values of <math>M_{d,in}</math>, <math>M_{d,out}</math>, <math>B_{ws,in}</math>, <math>B_{ws,out}</math>, <math>M_{s,in}</math> and <math>M_{s,out}</math> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.</p>
<b>Measuring/Reading/Recording frequency</b>	Once per second
<b>Calculation method (if applicable)</b>	<p>Equation 14 in the applied methodology</p> $E_{SF6in} = 65.18 Q_{in} [SF_{6in}]$
<b>QA/QC procedures</b>	<p>Daily sum of <math>E_{SF6,in}</math> value is automatically calculated by a data processing program and recorded in a daily log by operators. The log is double-checked by the head of O&amp;M team and sum of weekly and monthly data are reported to the project participants periodically.</p> <p>More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.</p>
<b>Purpose of data</b>	This data is used for the baseline emission calculation.
<b>Additional comment</b>	





<b>Data/Parameter</b>	$E_{SF6,out}$
<b>Unit</b>	Gram / second
<b>Description</b>	Emissions of SF <sub>6</sub> gas measured at the outlet of the SF <sub>6</sub> abatement system
<b>Measured/Calculated /Default</b>	Calculated
<b>Source of data</b>	Data processing program
<b>Value(s) of monitored parameter</b>	Sums of the daily, weekly and monthly data of $E_{SF6,out}$ are recorded and reported.
<b>Monitoring equipment</b>	<p>0.01 gram / second</p> <p>This is the average value during the monitoring period.</p> <p>To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of <math>V_{s,in}</math>, <math>V_{s,out}</math>, <math>Q_{in}</math>, <math>Q_{out}</math>, <math>E_{SF6,in}</math> and <math>E_{SF6,out}</math> using each real-time value of <math>P_{s,in}</math>, <math>P_{s,out}</math>, <math>T_{s,in}</math>, <math>T_{s,out}</math>, <math>P_{avg,in}</math>, <math>P_{avg,out}</math> and SF<sub>6</sub> concentration and fixed values of <math>M_{d,in}</math>, <math>M_{d,out}</math>, <math>B_{ws,in}</math>, <math>B_{ws,out}</math>, <math>M_{s,in}</math> and <math>M_{s,out}</math> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.</p>
<b>Measuring/Reading/Recording frequency</b>	Once per second
<b>Calculation method (if applicable)</b>	<p>Equation 15 in the applied methodology</p> $E_{SF6,out} = 65.18 Q_{out} [SF_{6,out}]$
<b>QA/QC procedures</b>	<p>Daily sum of <math>E_{SF6,out}</math> value is automatically calculated by a data processing program and recorded in a daily log by operators. The log is double-checked by the head of O&amp;M team and sum of weekly and monthly data are reported to the project participants periodically.</p> <p>More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.</p>
<b>Purpose of data</b>	This data is used for the project emission calculation.
<b>Additional comment</b>	



<b>Data/Parameter</b>	<b>M<sub>s,in</sub></b>
<b>Unit</b>	g/mole
<b>Description</b>	Maximum molecular weight of inlet stack gas, wet basis
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	Data processing program, inlet QMS and water vapour measurement report
<b>Value(s) of monitored parameter</b>	28.275 g/mole (determined on Jun. 22, 2011) M <sub>d,in</sub> , M <sub>d,out</sub> , B <sub>ws,in</sub> , B <sub>ws,out</sub> , M <sub>s,in</sub> and M <sub>s,out</sub> were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.
<b>Monitoring equipment</b>	Not applicable This is a calculated data.
<b>Measuring/Reading/Recording frequency</b>	Once per year, at least
<b>Calculation method (if applicable)</b>	Equation 8 in the applied methodology $M_{s,in} = M_{d,in} \cdot (100 - B_{ws,in}) \div 100 + 0.18B_{ws,in}$
<b>QA/QC procedures</b>	This is a calculated data through measured M <sub>d,in</sub> and B <sub>ws,in</sub> . Therefore, QA/QC procedures for M <sub>s,in</sub> follow those of M <sub>d,in</sub> and B <sub>ws,in</sub> .
<b>Purpose of data</b>	This data is used for the baseline emission calculation.
<b>Additional comment</b>	

<b>Data/Parameter</b>	<b>M<sub>s,out</sub></b>
<b>Unit</b>	g/mole
<b>Description</b>	Minimum molecular weight of outlet stack gas, wet basis
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	Data processing program, outlet QMS and a water vapour measurement report
<b>Value(s) of monitored parameter</b>	28.036 g/mole (determined on Jun. 22, 2011) M <sub>d,in</sub> , M <sub>d,out</sub> , B <sub>ws,in</sub> , B <sub>ws,out</sub> , M <sub>s,in</sub> and M <sub>s,out</sub> were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.
<b>Monitoring equipment</b>	Not applicable This is a calculated data.
<b>Measuring/Reading/Recording frequency</b>	Once per year, at least
<b>Calculation method (if applicable)</b>	Equation 9 in the applied methodology $M_{s,out} = M_{d,out} \cdot (100 - B_{ws,out}) \div 100 + 0.18B_{ws,out}$
<b>QA/QC procedures</b>	This is a calculated data through measured M <sub>d,out</sub> and B <sub>ws,out</sub> . Therefore, QA/QC procedures for M <sub>s,out</sub> follow those of M <sub>d,out</sub> and B <sub>ws,out</sub> .
<b>Purpose of data</b>	This data is used for the Project emission calculation.
<b>Additional comment</b>	



<b>Data/Parameter</b>	$M_{d,in}$	
<b>Unit</b>	g/mole	
<b>Description</b>	Molecular weight of inlet stack gas (dry basis)	
<b>Measured/Calculated /Default</b>	calculated	
<b>Source of data</b>	From inlet QMS and an analyzing result report	
<b>Value(s) of monitored parameter</b>	28.850 g/mole (determined on Jun. 22, 2011) $M_{d,in}$ , $M_{d,out}$ , $B_{ws,in}$ , $B_{ws,out}$ , $M_{s,in}$ and $M_{s,out}$ were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.	
<b>Monitoring equipment</b>	inlet QMS	
	Type	Quadruple Mass spectrometry
	Accuracy class	$\pm 3\%$
	Serial number	2X31131
	Calibration frequency	Once per year
	Date of last Calibration	19/08/2010 (previous) 22/06/2011
	Validity	21/06/2012
<b>Measuring/Reading/Recording frequency</b>	Once per year, at least	
<b>Calculation method (if applicable)</b>	Equation 6 in the applied methodology and relevant clauses thereof. $M_{d,in} = 1.460[SF_{6in}] + 0.440[CO_{2in}] + 0.320[O_{2in}] + 0.280[N_{2in}] + 0.399[Ar_{in}] + 1.021[SO_2F_{2in}] + 0.040[He_{in}]$	
<b>QA/QC procedures</b>	QMS was calibrated with all components having more than 100 ppmv concentrations in inlet gas, which include $SF_6$ , $CO_2$ , $O_2$ , $N_2$ , Ar, $SO_2F_2$ and He. And the applied value of $M_{d,in}$ is higher than the actual maximum value of $M_{d,in}$ (rounded up) during the 6 hours measuring period and this makes the emission reduction result more conservative. More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.	
<b>Purpose of data</b>	This data is used for the baseline emission calculation.	
<b>Additional comment</b>		



<b>Data/Parameter</b>	$M_{d,out}$	
<b>Unit</b>	g/mole	
<b>Description</b>	Molecular weight of outlet stack gas (dry basis)	
<b>Measured/Calculated/Default</b>	calculated	
<b>Source of data</b>	From outlet QMS and an analyzing result report	
<b>Value(s) of monitored parameter</b>	29.090 g/mole (determined on Jun. 22, 2011) $M_{d,in}$ , $M_{d,out}$ , $B_{ws,in}$ , $B_{ws,out}$ , $M_{s,in}$ and $M_{s,out}$ were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.	
<b>Monitoring equipment</b>	outlet QMS	
	Type	Quadruple Mass spectrometry
	Accuracy class	$\pm 3\%$
	Serial number	2X31132
	Calibration frequency	Once per year
	Date of last Calibration	19/08/2010 (previous) 22/06/2011
	Validity	21/06/2012
<b>Measuring/Reading/Recording frequency</b>	Once per year, at least	
<b>Calculation method (if applicable)</b>	Equation 7 in the applied methodology and relevant clauses thereof. $M_{d,out} = 0.440[CO_{2out}] + 0.320[O_{2out}] + 0.280[N_{2out}] + 0.399[Ar_{out}] + 0.040[He_{out}]$	
<b>QA/QC procedures</b>	QMS was calibrated with all components having more than 100 ppmv concentrations in outlet gas, which include $CO_2$ , $O_2$ , $N_2$ , Ar and He. And the applied value of $M_{d,out}$ is lower than the actual maximum value of $M_{d,out}$ (rounded down) during the 6 hours measuring period and this makes the emission reduction result more conservative More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.	
<b>Purpose of data</b>	This data is used for the project emission calculation.	
<b>Additional comment</b>		



<b>Data/Parameter</b>	<b>B<sub>ws,in</sub></b>												
<b>Unit</b>	dimensionless (percentage volume fraction)												
<b>Description</b>	The proportion of water in the inlet gas stream measured using EPA method 4, and used to calculate the inlet gas molecular weight.												
<b>Measured/Calculated/Default</b>	Measured												
<b>Source of data</b>	a measurement report												
<b>Value(s) of monitored parameter</b>	5.3% (determined on Jun. 22, 2011) M <sub>d,in</sub> , M <sub>d,out</sub> , B <sub>ws,in</sub> , B <sub>ws,out</sub> , M <sub>s,in</sub> and M <sub>s,out</sub> were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.												
<b>Monitoring equipment</b>	<p>This data was measured by an independent measurement company in accordance with the EPA method.</p> <p>Inlet water proportion analyzer</p> <table border="1"> <tr> <td>Type</td><td>Gas Sampling Analyzer</td></tr> <tr> <td>Accuracy class</td><td>±5%</td></tr> <tr> <td>Serial number</td><td>80-091100-1</td></tr> <tr> <td>Calibration frequency</td><td>Once per 2 years</td></tr> <tr> <td>Date of last Calibration</td><td>24/11/2008 (previous) 13/12/2010</td></tr> <tr> <td>Validity</td><td>12/12/2012</td></tr> </table>	Type	Gas Sampling Analyzer	Accuracy class	±5%	Serial number	80-091100-1	Calibration frequency	Once per 2 years	Date of last Calibration	24/11/2008 (previous) 13/12/2010	Validity	12/12/2012
Type	Gas Sampling Analyzer												
Accuracy class	±5%												
Serial number	80-091100-1												
Calibration frequency	Once per 2 years												
Date of last Calibration	24/11/2008 (previous) 13/12/2010												
Validity	12/12/2012												
<b>Measuring/Reading/Recording frequency</b>	Once per year, at least												
<b>Calculation method (if applicable)</b>	This value was measured by an independent measuring and analyzing company and the entire measurement procedure followed EPA method 4.												
<b>QA/QC procedures</b>	<p>This measurement was done for 6 hours during normal manufacturing conditions. The averaged proportion of water during the 6 hours period is used to calculate the inlet gas stream density.</p> <p>More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.</p>												
<b>Purpose of data</b>	This data is used for the baseline emission calculation.												
<b>Additional comment</b>													



<b>Data/Parameter</b>	$B_{ws,out}$												
<b>Unit</b>	dimensionless (percentage volume fraction)												
<b>Description</b>	The proportion of water in the outlet gas stream measured using EPA method 4, and used to calculate the outlet gas molecular weight.												
<b>Measured/Calculated/Default</b>	Measured												
<b>Source of data</b>	a measurement report												
<b>Value(s) of monitored parameter</b>	9.5% (determined on Jun. 22, 2011) $M_{d,in}$ , $M_{d,out}$ , $B_{ws,in}$ , $B_{ws,out}$ , $M_{s,in}$ and $M_{s,out}$ were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.												
<b>Monitoring equipment</b>	<p>This data was measured by an independent measurement company in accordance with the EPA method.</p> <p>outlet water proportion analyzer</p> <table border="1"> <tr> <td>Type</td><td>Gas Sampling Analyzer</td></tr> <tr> <td>Accuracy class</td><td><math>\pm 5\%</math></td></tr> <tr> <td>Serial number</td><td>601023</td></tr> <tr> <td>Calibration frequency</td><td>Once per 2 years</td></tr> <tr> <td>Date of last Calibration</td><td>17/03/2010</td></tr> <tr> <td>Validity</td><td>16/03/2012</td></tr> </table>	Type	Gas Sampling Analyzer	Accuracy class	$\pm 5\%$	Serial number	601023	Calibration frequency	Once per 2 years	Date of last Calibration	17/03/2010	Validity	16/03/2012
Type	Gas Sampling Analyzer												
Accuracy class	$\pm 5\%$												
Serial number	601023												
Calibration frequency	Once per 2 years												
Date of last Calibration	17/03/2010												
Validity	16/03/2012												
<b>Measuring/Reading/Recording frequency</b>	Once per year, at least												
<b>Calculation method (if applicable)</b>	This value was measured by an independent measuring and analyzing company and the entire measurement procedure followed EPA method 4.												
<b>QA/QC procedures</b>	This measurement was done for 6 hours during normal manufacturing conditions. The averaged proportion of water during the 6 hours period is used to calculate the inlet gas stream density. More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.												
<b>Purpose of data</b>	This data is used for the project emission calculation.												
<b>Additional comment</b>													





Data/Parameter	Absolute inlet stack pressure ( $P_{s,in}$ )	
Unit	mmHg	
Description	The inlet stack pressure measured during manufacturing operations	
Measured/Calculated /Default	measured	
Source of data	From inlet annubar	
Value(s) of monitored parameter	825 mmHg This is the average value during the monitoring period. To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of $V_{s,in}$ , $V_{s,out}$ , $Q_{in}$ , $Q_{out}$ , $E_{SF6,in}$ and $E_{SF6,out}$ using each real-time value of $P_{s,in}$ , $P_{s,out}$ , $T_{s,in}$ , $T_{s,out}$ , $P_{avg,in}$ , $P_{avg,out}$ and $SF_6$ concentration and fixed values of $M_{d,in}$ , $M_{d,out}$ , $B_{ws,in}$ , $B_{ws,out}$ , $M_{s,in}$ and $M_{s,out}$ which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.	
Monitoring equipment	(inlet annubar device)	
	Type	Differential Pressure-Pitot tube
	Accuracy class	$\pm 3\%$
	Serial number	69453A
	Calibration frequency	Once per year
	Date of last Calibration	23/06/2010 (previous) 21/06/2011
	Validity	20/06/2012
Measuring/Reading/Recording frequency	This value is monitored for every second and used to calculate $E_{SF6,in}$ .	
Calculation method (if applicable)	Not applicable	
QA/QC procedures	This value is measured in accordance with the EPA guideline.	
Purpose of data	This data is used for the baseline emission calculation.	
Additional comment		



Data/Parameter	Absolute outlet stack pressure ( $P_{s,out}$ )	
Unit	mmHg	
Description	The outlet stack pressure measured during manufacturing operations	
Measured/Calculated /Default	measured	
Source of data	From outlet annubar	
Value(s) of monitored parameter	759 mmHg This is the average value during the monitoring period. To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of $V_{s,in}$ , $V_{s,out}$ , $Q_{in}$ , $Q_{out}$ , $E_{SF6,in}$ and $E_{SF6,out}$ using each real-time value of $P_{s,in}$ , $P_{s,out}$ , $T_{s,in}$ , $T_{s,out}$ , $P_{avg,in}$ , $P_{avg,out}$ and $SF_6$ concentration and fixed values of $M_{d,in}$ , $M_{d,out}$ , $B_{ws,in}$ , $B_{ws,out}$ , $M_{s,in}$ and $M_{s,out}$ which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.	
Monitoring equipment	(outlet annubar device)	
	Type	Differential Pressure-Pitot tube
	Accuracy class	$\pm 3\%$
	Serial number	69453B
	Calibration frequency	Once per year
	Date of last Calibration	23/06/2010 (previous) 21/06/2011
	Validity	20/06/2012
Measuring/Reading/Recording frequency	This value is monitored for every second and used to calculate $E_{SF6,out}$ .	
Calculation method (if applicable)	Not applicable	
QA/QC procedures	This value is measured in accordance with the EPA guideline.	
Purpose of data	This data is used for the project emission calculation.	
Additional comment		



Data/Parameter	Absolute inlet stack temperature ( $T_{s,in}$ )	
Unit	K	
Description	The inlet stack temperature measured during manufacturing operations	
Measured/Calculated /Default	Measured	
Source of data	From inlet annubar	
Value(s) of monitored parameter	304 K This is the average value during the monitoring period. To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of $V_{s,in}$ , $V_{s,out}$ , $Q_{in}$ , $Q_{out}$ , $E_{SF6,in}$ and $E_{SF6,out}$ using each real-time value of $P_{s,in}$ , $P_{s,out}$ , $T_{s,in}$ , $T_{s,out}$ , $P_{avg,in}$ , $P_{avg,out}$ and $SF_6$ concentration and fixed values of $M_{d,in}$ , $M_{d,out}$ , $B_{ws,in}$ , $B_{ws,out}$ , $M_{s,in}$ and $M_{s,out}$ which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.	
Monitoring equipment	(inlet annubar device)	
	Type	Standard Platinum Resistance Thermometer
	Accuracy class	$\pm 3\%$
	Serial number	69453A
	Calibration frequency	Once per year
	Date of last Calibration	23/06/2010 (previous) 21/06/2011
	Validity	20/06/2012
Measuring/Reading/Recording frequency	This value is monitored for every second and used to calculate $E_{SF6,in}$ .	
Calculation method (if applicable)	Not applicable	
QA/QC procedures	This value is measured in accordance with the EPA guideline.	
Purpose of data	This data is used for the baseline emission calculation.	
Additional comment		



Data/Parameter	Absolute outlet stack temperature ( $T_{s,out}$ )	
Unit	K	
Description	The outlet stack temperature measured during manufacturing operations	
Measured/Calculated /Default	Measured	
Source of data	From outlet annubar	
Value(s) of monitored parameter	327 K This is the average value during the monitoring period. To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of $V_{s,in}$ , $V_{s,out}$ , $Q_{in}$ , $Q_{out}$ , $E_{SF6,in}$ and $E_{SF6,out}$ using each real-time value of $P_{s,in}$ , $P_{s,out}$ , $T_{s,in}$ , $T_{s,out}$ , $P_{avg,in}$ , $P_{avg,out}$ and $SF_6$ concentration and fixed values of $M_{d,in}$ , $M_{d,out}$ , $B_{ws,in}$ , $B_{ws,out}$ , $M_{s,in}$ and $M_{s,out}$ which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.	
Monitoring equipment	(outlet annubar device)	
	Type	Standard Platinum Resistance Thermometer
	Accuracy class	$\pm 3\%$
	Serial number	69453B
	Calibration frequency	Once per year
	Date of last Calibration	23/06/2010 (previous) 21/06/2011
	Validity	20/06/2012
Measuring/Reading/Recording frequency	This value is monitored for every second and used to calculate $E_{SF6,out}$ .	
Calculation method (if applicable)	Not applicable	
QA/QC procedures	This value is measured in accordance with the EPA guideline.	
Purpose of data	This data is used for the project emission calculation.	
Additional comment		



Data/Parameter	Velocity head measurement by inlet Annubar device ( $p_{avg,in}$ )	
Unit	mmH <sub>2</sub> O	
Description	The averaged velocity head measurement used to calculate the inlet gas velocity	
Measured/Calculated /Default	Measured	
Source of data	From inlet annubar	
Value(s) of monitored parameter	<p>1.40 mmH<sub>2</sub>O</p> <p>This is the average value during the monitoring period.</p> <p>To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of <math>V_{s,in}</math>, <math>V_{s,out}</math>, <math>Q_{in}</math>, <math>Q_{out}</math>, <math>E_{SF6,in}</math> and <math>E_{SF6,out}</math> using each real-time value of <math>P_{s,in}</math>, <math>P_{s,out}</math>, <math>T_{s,in}</math>, <math>T_{s,out}</math>, <math>P_{avg,in}</math>, <math>P_{avg,out}</math> and SF<sub>6</sub> concentration and fixed values of <math>M_{d,in}</math>, <math>M_{d,out}</math>, <math>B_{ws,in}</math>, <math>B_{ws,out}</math>, <math>M_{s,in}</math> and <math>M_{s,out}</math> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.</p>	
Monitoring equipment	(inlet annubar device)	
	Type	Differential Pressure-Pitot tube
	Accuracy class	±3%
	Serial number	69453A
	Calibration frequency	Once per year
	Date of last Calibration	23/06/2010 (previous) 21/06/2011
	Validity	20/06/2012
Measuring/Reading/Recording frequency	This value is monitored for every second and used to calculate $E_{SF6,in}$ .	
Calculation method (if applicable)	Not applicable	
QA/QC procedures	This value is measured in accordance with the EPA guideline.	
Purpose of data	This data is used for the baseline emission calculation.	
Additional comment		



<b>Data/Parameter</b>	Velocity head measurement by outlet Annubar device ( $p_{avg,out}$ )												
<b>Unit</b>	mmH <sub>2</sub> O												
<b>Description</b>	The averaged velocity head measurement used to calculate the outlet gas velocity												
<b>Measured/Calculated/Default</b>	Measured												
<b>Source of data</b>	From outlet annubar												
<b>Value(s) of monitored parameter</b>	<p>0.77 mmH<sub>2</sub>O</p> <p>This is the average value during the monitoring period.</p> <p>To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of <math>V_{s,in}</math>, <math>V_{s,out}</math>, <math>Q_{in}</math>, <math>Q_{out}</math>, <math>E_{SF6,in}</math> and <math>E_{SF6,out}</math> using each real-time value of <math>P_{s,in}</math>, <math>P_{s,out}</math>, <math>T_{s,in}</math>, <math>T_{s,out}</math>, <math>P_{avg,in}</math>, <math>P_{avg,out}</math> and SF<sub>6</sub> concentration and fixed values of <math>M_{d,in}</math>, <math>M_{d,out}</math>, <math>B_{ws,in}</math>, <math>B_{ws,out}</math>, <math>M_{s,in}</math> and <math>M_{s,out}</math> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.</p>												
<b>Monitoring equipment</b>	<p>(outlet annubar device)</p> <table border="1"> <tr> <td>Type</td><td>Differential Pressure-Pitot tube</td></tr> <tr> <td>Accuracy class</td><td>±3%</td></tr> <tr> <td>Serial number</td><td>69453B</td></tr> <tr> <td>Calibration frequency</td><td>Once per year</td></tr> <tr> <td>Date of last Calibration</td><td>23/06/2010 (previous) 21/06/2011</td></tr> <tr> <td>Validity</td><td>20/06/2012</td></tr> </table>	Type	Differential Pressure-Pitot tube	Accuracy class	±3%	Serial number	69453B	Calibration frequency	Once per year	Date of last Calibration	23/06/2010 (previous) 21/06/2011	Validity	20/06/2012
Type	Differential Pressure-Pitot tube												
Accuracy class	±3%												
Serial number	69453B												
Calibration frequency	Once per year												
Date of last Calibration	23/06/2010 (previous) 21/06/2011												
Validity	20/06/2012												
<b>Measuring/Reading/Recording frequency</b>	This value is monitored for every second and used to calculate $E_{SF6,out}$ .												
<b>Calculation method (if applicable)</b>	Not applicable												
<b>QA/QC procedures</b>	This value is measured in accordance with the EPA guideline.												
<b>Purpose of data</b>	This data is used for the project emission calculation.												
<b>Additional comment</b>													





<b>Data/Parameter</b>	Inlet gas velocity ( $v_{s,in}$ )
<b>Unit</b>	m/sec
<b>Description</b>	Inlet gas velocity
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	Data processing program
<b>Value(s) of monitored parameter</b>	<p>4.71 m/sec</p> <p>This is the average value during the monitoring period.</p> <p>To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of <math>V_{s,in}</math>, <math>V_{s,out}</math>, <math>Q_{in}</math>, <math>Q_{out}</math>, <math>E_{SF6,in}</math> and <math>E_{SF6,out}</math> using each real-time value of <math>P_{s,in}</math>, <math>P_{s,out}</math>, <math>T_{s,in}</math>, <math>T_{s,out}</math>, <math>P_{avg,in}</math>, <math>P_{avg,out}</math> and <math>SF_6</math> concentration and fixed values of <math>M_{d,in}</math>, <math>M_{d,out}</math>, <math>B_{ws,in}</math>, <math>B_{ws,out}</math>, <math>M_{s,in}</math> and <math>M_{s,out}</math> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.</p>
<b>Monitoring equipment</b>	<p>Not applicable</p> <p>This is a calculated data</p>
<b>Measuring/Reading/Recording frequency</b>	This value is calculated for every second and used to calculate $E_{SF6,in}$ .
<b>Calculation method (if applicable)</b>	<p>Equation 10 in the applied methodology</p> $v_{s,in} = K_p \cdot C_{p,in} \sqrt{P_{avg,in}} \sqrt{\frac{T_{s,in}}{P_{s,in} \cdot M_{s,in}}}$
<b>QA/QC procedures</b>	<p>Any <math>SF_6</math> emitted during periods of times where the gas velocity measured at the inlet decreases by more than 5%, compared to the averaged velocity, is completely discounted from the baseline emission.</p> <p>More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.</p>
<b>Purpose of data</b>	This data is used for the baseline emission calculation.
<b>Additional comment</b>	



<b>Data/Parameter</b>	Outlet gas velocity ( $v_{s,out}$ )
<b>Unit</b>	m/sec
<b>Description</b>	Outlet gas velocity
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	Data processing program
<b>Value(s) of monitored parameter</b>	<p>3.81 m/sec</p> <p>This is the average value during the monitoring period.</p> <p>To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of <math>V_{s,in}</math>, <math>V_{s,out}</math>, <math>Q_{in}</math>, <math>Q_{out}</math>, <math>E_{SF6,in}</math> and <math>E_{SF6,out}</math> using each real-time value of <math>P_{s,in}</math>, <math>P_{s,out}</math>, <math>T_{s,in}</math>, <math>T_{s,out}</math>, <math>P_{avg,in}</math>, <math>P_{avg,out}</math> and <math>SF_6</math> concentration and fixed values of <math>M_{d,in}</math>, <math>M_{d,out}</math>, <math>B_{ws,in}</math>, <math>B_{ws,out}</math>, <math>M_{s,in}</math> and <math>M_{s,out}</math> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.</p>
<b>Monitoring equipment</b>	<p>Not applicable</p> <p>This is a calculated data.</p>
<b>Measuring/Reading/Recording frequency</b>	This value is calculated for every second and used to calculate $E_{SF6,out}$ .
<b>Calculation method (if applicable)</b>	<p>Equation 11 in the applied methodology</p> $v_{s,out} = K_p \cdot C_{p,out} \sqrt{P_{avg,out}} \sqrt{\frac{T_{s,out}}{P_{s,out} \cdot M_{s,out}}}$
<b>QA/QC procedures</b>	<p>Any <math>SF_6</math> emitted during periods of times where the gas velocity measured at the outlet increases by more than 5%, compared to the averaged velocity, is completely discounted from the baseline emission.</p> <p>More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.</p>
<b>Purpose of data</b>	This data is used for the project emission calculation.
<b>Additional comment</b>	



<b>Data/Parameter</b>	Inlet stack volumetric flow rate ( $Q_{in}$ )
<b>Unit</b>	m <sup>3</sup> /sec
<b>Description</b>	Inlet volumetric flow rate
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	Data processing program
<b>Value(s) of monitored parameter</b>	<p>0.45 m<sup>3</sup>/sec</p> <p>This is the average value during the monitoring period.</p> <p>To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of <math>V_{s,in}</math>, <math>V_{s,out}</math>, <math>Q_{in}</math>, <math>Q_{out}</math>, <math>E_{SF6,in}</math> and <math>E_{SF6,out}</math> using each real-time value of <math>P_{s,in}</math>, <math>P_{s,out}</math>, <math>T_{s,in}</math>, <math>T_{s,out}</math>, <math>P_{avg,in}</math>, <math>P_{avg,out}</math> and SF<sub>6</sub> concentration and fixed values of <math>M_{d,in}</math>, <math>M_{d,out}</math>, <math>B_{ws,in}</math>, <math>B_{ws,out}</math>, <math>M_{s,in}</math> and <math>M_{s,out}</math> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.</p>
<b>Monitoring equipment</b>	<p>Not applicable</p> <p>This is a calculated data.</p>
<b>Measuring/Reading/Recording frequency</b>	This value is calculated for every second and used to calculate $E_{SF6,in}$ .
<b>Calculation method (if applicable)</b>	<p>Equation 12 in the applied methodology</p> $Q_{in} = \{(100 - B_{ws,in}) \div 100\} V_{s,in} \cdot A_{in} \left[ \frac{T_{std} \cdot P_{s,in}}{T_{s,in} \cdot P_{std}} \right]$
<b>QA/QC procedures</b>	<p>Any SF<sub>6</sub> emissions measured when the value of the gas flow measured at the inlet of the abatement system during the monitoring period decreases by more than 5%, compared to the baseline flow rate measured, is discounted from the baseline emission.</p> <p>More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.</p>
<b>Purpose of data</b>	This data is used for the baseline emission calculation.
<b>Additional comment</b>	



<b>Data/Parameter</b>	Outlet stack volumetric flow rate ( $Q_{out}$ )
<b>Unit</b>	m <sup>3</sup> /sec
<b>Description</b>	Outlet volumetric flow rate
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	Data processing program
<b>Value(s) of monitored parameter</b>	<p>0.87 m<sup>3</sup>/sec</p> <p>This is the average value during the monitoring period.</p> <p>To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of <math>V_{s,in}</math>, <math>V_{s,out}</math>, <math>Q_{in}</math>, <math>Q_{out}</math>, <math>E_{SF6,in}</math> and <math>E_{SF6,out}</math> using each real-time value of <math>P_{s,in}</math>, <math>P_{s,out}</math>, <math>T_{s,in}</math>, <math>T_{s,out}</math>, <math>P_{avg,in}</math>, <math>P_{avg,out}</math> and <math>SF_6</math> concentration and fixed values of <math>M_{d,in}</math>, <math>M_{d,out}</math>, <math>B_{ws,in}</math>, <math>B_{ws,out}</math>, <math>M_{s,in}</math> and <math>M_{s,out}</math> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.</p>
<b>Monitoring equipment</b>	<p>Not applicable</p> <p>This is a calculated data</p>
<b>Measuring/Reading/Recording frequency</b>	This value is calculated for every second and used to calculate $E_{SF6,out}$ .
<b>Calculation method (if applicable)</b>	<p>Equation 13 in the applied methodology</p> $Q_{out} = \{(100 - B_{ws,out}) \div 100\} V_{s,out} \cdot A_{out} \left[ \frac{T_{std} \cdot P_{s,out}}{T_{s,out} \cdot P_{std}} \right]$
<b>QA/QC procedures</b>	<p>Any SF6 emissions measured when the value of the gas flow measured at the outlet of the abatement system during the monitoring period increases by more than 5%, compared to the baseline flow rate measured, is discounted from the baseline emission.</p> <p>More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.</p>
<b>Purpose of data</b>	This data is used for the project emission calculation.
<b>Additional comment</b>	



Data/Parameter	Inlet SF <sub>6</sub> concentration															
Unit	ppm															
Description	Inlet SF <sub>6</sub> concentration measured by FTIR															
Measured/Calculated /Default	Measured															
Source of data	From inlet FTIR															
Value(s) of monitored parameter	251.6 ppm This is the average value during the monitoring period. To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of V <sub>s,in</sub> , V <sub>s,out</sub> , Q <sub>in</sub> , Q <sub>out</sub> , E <sub>SF6,in</sub> and E <sub>SF6,out</sub> using each real-time value of P <sub>s,in</sub> , P <sub>s,out</sub> , T <sub>s,in</sub> , T <sub>s,out</sub> , P <sub>avg,in</sub> , P <sub>avg,out</sub> and SF <sub>6</sub> concentration and fixed values of M <sub>d,in</sub> , M <sub>d,out</sub> , B <sub>ws,in</sub> , B <sub>ws,out</sub> , M <sub>s,in</sub> and M <sub>s,out</sub> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.															
Monitoring equipment	<table><tr><td colspan="2">Inlet FTIR</td></tr><tr><td>Type</td><td>FT-IR spectrometry</td></tr><tr><td>Accuracy class</td><td>±2%</td></tr><tr><td>Serial number</td><td>580</td></tr><tr><td>Calibration frequency</td><td>Once per year</td></tr><tr><td>Date of last Calibration</td><td>07/12/2010 (previous) 22/06/2011</td></tr><tr><td>Validity</td><td>21/06/2012</td></tr></table>		Inlet FTIR		Type	FT-IR spectrometry	Accuracy class	±2%	Serial number	580	Calibration frequency	Once per year	Date of last Calibration	07/12/2010 (previous) 22/06/2011	Validity	21/06/2012
Inlet FTIR																
Type	FT-IR spectrometry															
Accuracy class	±2%															
Serial number	580															
Calibration frequency	Once per year															
Date of last Calibration	07/12/2010 (previous) 22/06/2011															
Validity	21/06/2012															
Measuring/Reading/ Recording frequency	Once per 40 seconds															
Calculation method (if applicable)	Not applicable															
QA/QC procedures	FTIR shall be calibrated in accordance with the Methodology requirement. More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.															
Purpose of data	This data is used for the baseline emission calculation.															
Additional comment																



Data/Parameter	Outlet SF <sub>6</sub> concentration															
Unit	ppm															
Description	Outlet SF <sub>6</sub> concentration measured by FTIR															
Measured/Calculated /Default	Measured															
Source of data	From outlet FTIR															
Value(s) of monitored parameter	2.0 ppm This is the average value during the monitoring period. To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of V <sub>s,in</sub> , V <sub>s,out</sub> , Q <sub>in</sub> , Q <sub>out</sub> , E <sub>SF6,in</sub> and E <sub>SF6,out</sub> using each real-time value of P <sub>s,in</sub> , P <sub>s,out</sub> , T <sub>s,in</sub> , T <sub>s,out</sub> , P <sub>avg,in</sub> , P <sub>avg,out</sub> and SF <sub>6</sub> concentration and fixed values of M <sub>d,in</sub> , M <sub>d,out</sub> , B <sub>ws,in</sub> , B <sub>ws,out</sub> , M <sub>s,in</sub> and M <sub>s,out</sub> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.															
Monitoring equipment	<table><tr><td colspan="2">outlet FTIR</td></tr><tr><td>Type</td><td>FT-IR spectrometry</td></tr><tr><td>Accuracy class</td><td>±2%</td></tr><tr><td>Serial number</td><td>581</td></tr><tr><td>Calibration frequency</td><td>Once per year</td></tr><tr><td>Date of last Calibration</td><td>08/11/2010 (previous) 22/06/2011</td></tr><tr><td>Validity</td><td>21/06/2012</td></tr></table>		outlet FTIR		Type	FT-IR spectrometry	Accuracy class	±2%	Serial number	581	Calibration frequency	Once per year	Date of last Calibration	08/11/2010 (previous) 22/06/2011	Validity	21/06/2012
outlet FTIR																
Type	FT-IR spectrometry															
Accuracy class	±2%															
Serial number	581															
Calibration frequency	Once per year															
Date of last Calibration	08/11/2010 (previous) 22/06/2011															
Validity	21/06/2012															
Measuring/Reading/ Recording frequency	Once per 40 seconds															
Calculation method (if applicable)	Not applicable															
QA/QC procedures	FTIR shall be calibrated in accordance with the Methodology requirement. The average SF <sub>6</sub> concentration in the outlet of the abatement system is lower than 0.1 ppm which is confirmed by sampling & analyzing result implemented through more sensitive FTIR that can detect 0.1ppm of SF <sub>6</sub> . However, considering that the SF <sub>6</sub> detection range of the installed outlet FTIR is 2 ppm, any values below 2 ppm in outlet is counted as 2 ppm for more conservative calculation. More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.															
Purpose of data	This data is used for the project emission calculation.															
Additional comment																



<b>Data/Parameter</b>	<b>FC<sub>i,j,y</sub></b> volume unit per year of natural gas consumed by the abatement device.	
<b>Unit</b>	Nm <sup>3</sup>	
<b>Description</b>	Quantity of natural gas combusted in the abatement process during the year <i>y</i> (From February 1, 2012 to March 31, 2012, for this monitoring purpose.)	
<b>Measured/Calculated/Default</b>	Measured	
<b>Source of data</b>	<b>D.2.1. a LNG flow-meter</b>	
<b>Value(s) of monitored parameter</b>	194,245 Nm <sup>3</sup>	
<b>Monitoring equipment</b>	LNG flow meter	
	Type	LNG flow meter
	Accuracy class	± 2% (Grade 2, certified by Youngnam Energy Service)
	Serial number	606920
	Calibration frequency	Once per 8 years
	Date of last Calibration	21/07/2010
	Validity	20/07/2018
<b>Measuring/Reading/Recording frequency</b>	Recording Frequency: Once per second Calculating Frequency: Once per the given monitoring period	
<b>Calculation method (if applicable)</b>	Not applicable	
<b>QA/QC procedures</b>	The flow meter will be maintained by Korea Gas Corporation (a public enterprise). The value recorded in the system is 194,245 Nm <sup>3</sup> and the applied value comes from daily log book manually recorded by operators. The latter data recorded by operators has human errors as checking time of the meter cannot be exactly same for everyday. Nevertheless, the latter value is applied as it is higher than the system value. This is one of conservative approaches made for the emission reductions calculation.	
<b>Purpose of data</b>	This data is used for the project emission calculation.	
<b>Additional comment</b>		



<b>Data/Parameter</b>	WC,i,y
<b>Unit</b>	tC/tLNG
<b>Description</b>	Weighted average mass fraction of carbon in natural gas in year y
<b>Measured/Calculated /Default</b>	Default
<b>Source of data</b>	D.2.2. <b>Information provided by Korea Gas Corporation</b>
<b>Value(s) of monitored parameter</b>	0.752 tC/tLNG
<b>Monitoring equipment</b>	Not applicable This is an externally provided data.
<b>Measuring/Reading/Recording frequency</b>	Once per year (Last measurement conducted on Aug. 20, 2011)
<b>Calculation method (if applicable)</b>	Not applicable
<b>QA/QC procedures</b>	This is a standard value provided by Korea Gas Corporation and an official letter from Korean Gas Corporation regarding the above value has been provided to the DOE for verification purpose.
<b>Purpose of data</b>	This data is used for the project emission calculation.
<b>Additional comment</b>	

<b>Data/Parameter</b>	$\rho_i, y$
<b>Unit</b>	t natural gas/ m3 natural gas
<b>Description</b>	Weighted average density of natural gas in year y
<b>Measured/Calculated /Default</b>	Default
<b>Source of data</b>	D.2.3. <b>Korea Gas Corporation</b>
<b>Value(s) of monitored parameter</b>	$0.7976 * 10^{-3}$ t natural gas/ m3 natural gas
<b>Monitoring equipment</b>	Not applicable This is an externally provided data.
<b>Measuring/Reading/Recording frequency</b>	Once per year (Last measurement conducted on Aug. 20, 2011)
<b>Calculation method (if applicable)</b>	Not applicable
<b>QA/QC procedures</b>	This is a standard value provided by Korea Gas Corporation and an official letter from Korean Gas Corporation regarding the above value has been provided to the DOE for verification purpose.
<b>Purpose of data</b>	This data is used for the project emission calculation.
<b>Additional comment</b>	





<b>Data/Parameter</b>	EC <sub>y</sub>
<b>Unit</b>	kWh
<b>Description</b>	Electricity Consumption in year y (From February 1, 2012 to March 31, 2012, for this monitoring purpose.)
<b>Measured/Calculated /Default</b>	Measured
<b>Source of data</b>	D.2.4. <b>Logbooks and 6 electricity meters</b>
<b>Value(s) of monitored parameter</b>	187,595 kWh

**Monitoring equipment****Meter #1**

Type	Electric meter
Accuracy class	$\pm 2\%$ (Grade 2, Certified by KEPCO)
Serial number	97001891
Calibration frequency	Once per 8 years
Date of last Calibration	20/12/2009
Validity	19/12/2017

**Meter #2**

Type	Electric meter
Accuracy class	$\pm 2\%$ (Grade 2, Certified by KEPCO)
Serial number	90064842
Calibration frequency	Once per 10 years
Date of last Calibration	10/12/2009
Validity	09/12/2019

**Meter #3**

Type	Electric meter
Accuracy class	$\pm 2\%$ (Grade 2, Certified by KEPCO)
Serial number	98001026
Calibration frequency	Once per 8 years
Date of last Calibration	30/09/2009
Validity	29/09/2017

**Meter #4**

Type	Electric meter
Accuracy class	$\pm 2\%$ (Grade 2, Certified by KEPCO)
Serial number	9084449
Calibration frequency	Once per 8 years
Date of last Calibration	13/01/2009
Validity	12/01/2017

**Meter #5**

Type	Electric meter
Accuracy class	$\pm 2\%$ (Grade 2, Certified by KEPCO)
Serial number	90064836
Calibration frequency	Once per 10 years
Date of last Calibration	10/12/2009
Validity	09/12/2019

**Meter #6**

Type	Electric meter
Accuracy class	$\pm 2\%$ (Grade 2, Certified by KEPCO)
Serial number	90004868
Calibration frequency	Once per 10 years
Date of last Calibration	10/10/2009
Validity	09/10/2019



<b>Measuring/Reading/Recording frequency</b>	Recording Frequency: Once per second Calculating Frequency: Once per the given monitoring period
<b>Calculation method (if applicable)</b>	Not applicable
<b>QA/QC procedures</b>	Data from logbooks and electrically gathered data from each electricity meter may be different from each other due to communication noise or transmission errors. If both data do not perfectly match, higher value shall be applied for more conservative outcome. The value recorded in the system 187,595 kWh is greater than daily log book data (187,563kWh) manually recorded by operators. The greater value is applied for conservativeness.
<b>Purpose of data</b>	This data is used for the project emission calculation.
<b>Additional comment</b>	

**[Plant 7 in Paju]**

<b>Data/Parameter</b>	$E_{SF6,in,y}$
<b>Unit</b>	tonnes
<b>Description</b>	Mass of SF <sub>6</sub> gas entering the abatement device in year y (From February 1, 2012 to March 31, 2012, for this monitoring purpose.)
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	Data processing program and Daily/weekly/monthly logs
<b>Value(s) of monitored parameter</b>	9.6068 tonnes
<b>Monitoring equipment</b>	This value is a sum of daily $E_{SF6,in}$ values for the monitoring period. For the monitoring equipment information of $E_{SF6,in}$ , please refer to the $E_{SF6,in}$ table in this section.
<b>Measuring/Reading/Recording frequency</b>	Once per year or a monitoring period, whichever is shorter.
<b>Calculation method (if applicable)</b>	Sum of daily $E_{SF6,in}$
<b>QA/QC procedures</b>	Daily sum of $E_{SF6,in}$ value is automatically calculated by a data processing program and recorded in a daily log by operators. The log is double-checked by the head of O&M team and sum of weekly and monthly data are reported to the project participants periodically. More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.
<b>Purpose of data</b>	This data is used for the Baseline emission calculation
<b>Additional comment</b>	



<b>Data/Parameter</b>	$C_{SF6,y}$
<b>Unit</b>	Tonnes
<b>Description</b>	Annual consumption of SF <sub>6</sub> during the project year y, defined as the total SF <sub>6</sub> purchased in a specific project year y taking into account the change in inventory in the same year. (From February 1, 2012 to March 31, 2012, for this monitoring purpose.)
<b>Measured/Calculated /Default</b>	Calculated
<b>Source of data</b>	Purchase records, monthly records on SF <sub>6</sub> inventory change and cylinder replacement records.
<b>Value(s) of monitored parameter</b>	19.383 tonnes
<b>Monitoring equipment</b>	Not applicable
<b>Measuring/Reading/ Recording frequency</b>	Once per year or a monitoring period, whichever is shorter.
<b>Calculation method (if applicable)</b>	(Total SF <sub>6</sub> purchase Amount – Inventory change) * 10% of heel value
<b>QA/QC procedures</b>	This data is cross-checked with official purchase records and inventory data is measured and recorded at the beginning and end of each month. Residual gas quantity (Heel value), which is smaller than 10%, is measured and recorded every replacement. The average value of the residual gas quantity during the monitoring period is 6.0%. However, for more conservative calculation, 10% of heel value is applied in the emission reduction calculation.
<b>Purpose of data</b>	This data is used for the baseline emission calculation.
<b>Additional comment</b>	

<b>Data/Parameter</b>	$SP_{project,y}$
<b>Unit</b>	m <sup>2</sup>
<b>Description</b>	Production of LCD substrate during the project year y (From February 1, 2012 to March 31, 2012, for this monitoring purpose.)
<b>Measured/Calculated /Default</b>	Measured
<b>Source of data</b>	Manufacturing Execution system of LG Display
<b>Value(s) of monitored parameter</b>	1,482,492 m <sup>2</sup>
<b>Monitoring equipment</b>	This data comes from the Manufacturing Execution System of LG Display, which is a computerized system commonly used in the manufacturing industry.
<b>Measuring/Reading/ Recording frequency</b>	Once per year or a monitoring period, whichever is shorter.
<b>Calculation method (if applicable)</b>	Not applicable
<b>QA/QC procedures</b>	Cross check with LGD's monthly & annual production summary reports
<b>Purpose of data</b>	This data is used for the baseline emission calculation.
<b>Additional comment</b>	



<b>Data/Parameter</b>	$E_{SF6,in}$
<b>Unit</b>	Gram / second
<b>Description</b>	Emissions of SF <sub>6</sub> gas measured at the inlet of the SF <sub>6</sub> abatement system
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	From inlet QMS, FTIR and inlet Annubar devices
<b>Value(s) of monitored parameter</b>	Sums of the daily, weekly and monthly data of $E_{SF6,in}$ are recorded and reported.
<b>Monitoring equipment</b>	<p>1.94 gram / second</p> <p>This is the average value during the monitoring period.</p> <p>To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of <math>V_{s,in}</math>, <math>V_{s,out}</math>, <math>Q_{in}</math>, <math>Q_{out}</math>, <math>E_{SF6,in}</math> and <math>E_{SF6,out}</math> using each real-time value of <math>P_{s,in}</math>, <math>P_{s,out}</math>, <math>T_{s,in}</math>, <math>T_{s,out}</math>, <math>P_{avg,in}</math>, <math>P_{avg,out}</math> and SF<sub>6</sub> concentration and fixed values of <math>M_{d,in}</math>, <math>M_{d,out}</math>, <math>B_{ws,in}</math>, <math>B_{ws,out}</math>, <math>M_{s,in}</math> and <math>M_{s,out}</math> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.</p>
<b>Measuring/Reading/Recording frequency</b>	Once per second
<b>Calculation method (if applicable)</b>	<p>Equation 14 in the applied methodology</p> $E_{SF6in} = 65.18 Q_{in} [SF_{6in}]$
<b>QA/QC procedures</b>	<p>Daily sum of <math>E_{SF6,in}</math> value is automatically calculated by a data processing program and recorded in a daily log by operators. The log is double-checked by the head of O&amp;M team and sum of weekly and monthly data are reported to the project participants periodically.</p> <p>More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.</p>
<b>Purpose of data</b>	This data is used for the baseline emission calculation.
<b>Additional comment</b>	



<b>Data/Parameter</b>	$E_{SF6,out}$
<b>Unit</b>	Gram / second
<b>Description</b>	Emissions of $SF_6$ gas measured at the outlet of the $SF_6$ abatement system
<b>Measured/Calculated /Default</b>	Calculated
<b>Source of data</b>	Data processing program
<b>Value(s) of monitored parameter</b>	Sums of the daily, weekly and monthly data of $E_{SF6,out}$ are recorded and reported.
<b>Monitoring equipment</b>	<p>0.02 gram / second</p> <p>This is the average value during the monitoring period.</p> <p>To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of <math>V_{s,in}</math>, <math>V_{s,out}</math>, <math>Q_{in}</math>, <math>Q_{out}</math>, <math>E_{SF6,in}</math> and <math>E_{SF6,out}</math> using each real-time value of <math>P_{s,in}</math>, <math>P_{s,out}</math>, <math>T_{s,in}</math>, <math>T_{s,out}</math>, <math>P_{avg,in}</math>, <math>P_{avg,out}</math> and <math>SF_6</math> concentration and fixed values of <math>M_{d,in}</math>, <math>M_{d,out}</math>, <math>B_{ws,in}</math>, <math>B_{ws,out}</math>, <math>M_{s,in}</math> and <math>M_{s,out}</math> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.</p>
<b>Measuring/Reading/Recording frequency</b>	Once per second
<b>Calculation method (if applicable)</b>	<p>Equation 15 in the applied methodology</p> $E_{SF6out} = 65.18 Q_{out} [SF_{6out}]$
<b>QA/QC procedures</b>	<p>Daily sum of <math>E_{SF6,out}</math> value is automatically calculated by a data processing program and recorded in a daily log by operators. The log is double-checked by the head of O&amp;M team and sum of weekly and monthly data are reported to the project participants periodically.</p> <p>More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.</p>
<b>Purpose of data</b>	This data is used for the project emission calculation.
<b>Additional comment</b>	



<b>Data/Parameter</b>	<b>M<sub>s,in</sub></b>
<b>Unit</b>	g/mole
<b>Description</b>	Maximum molecular weight of inlet stack gas, wet basis
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	Data processing program, inlet QMS and water vapour measurement report
<b>Value(s) of monitored parameter</b>	28.338 g/mole (determined on Jan. 25, 2012) 28.093 g/mole (determined on Mar. 18, 2012) M <sub>d,in</sub> , M <sub>d,out</sub> , B <sub>ws,in</sub> , B <sub>ws,out</sub> , M <sub>s,in</sub> and M <sub>s,out</sub> were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.
<b>Monitoring equipment</b>	Not applicable This is a calculated data.
<b>Measuring/Reading/Recording frequency</b>	Once per year, at least
<b>Calculation method (if applicable)</b>	Equation 8 in the applied methodology $M_{s,in} = M_{d,in} \cdot (100 - B_{ws,in}) \div 100 + 0.18B_{ws,in}$
<b>QA/QC procedures</b>	This is a calculated data through measured M <sub>d,in</sub> and B <sub>ws,in</sub> . Therefore, QA/QC procedures for M <sub>s,in</sub> follow those of M <sub>d,in</sub> and B <sub>ws,in</sub> .
<b>Purpose of data</b>	This data is used for the baseline emission calculation.
<b>Additional comment</b>	

<b>Data/Parameter</b>	<b>M<sub>s,out</sub></b>
<b>Unit</b>	g/mole
<b>Description</b>	Minimum molecular weight of outlet stack gas, wet basis
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	Data processing program, outlet QMS and a water vapour measurement report
<b>Value(s) of monitored parameter</b>	28.328 g/mole (determined on Jan. 25, 2012) 27.409 g/mole (determined on Mar. 18, 2012) M <sub>d,in</sub> , M <sub>d,out</sub> , B <sub>ws,in</sub> , B <sub>ws,out</sub> , M <sub>s,in</sub> and M <sub>s,out</sub> were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.
<b>Monitoring equipment</b>	Not applicable This is a calculated data.
<b>Measuring/Reading/Recording frequency</b>	Once per year, at least
<b>Calculation method (if applicable)</b>	Equation 9 in the applied methodology $M_{s,out} = M_{d,out} \cdot (100 - B_{ws,out}) \div 100 + 0.18B_{ws,out}$
<b>QA/QC procedures</b>	This is a calculated data through measured M <sub>d,out</sub> and B <sub>ws,out</sub> . Therefore, QA/QC procedures for M <sub>s,out</sub> follow those of M <sub>d,out</sub> and B <sub>ws,out</sub> .
<b>Purpose of data</b>	This data is used for the Project emission calculation.
<b>Additional comment</b>	



Data/Parameter	M <sub>d,in</sub>	
Unit	g/mole	
Description	Molecular weight of inlet stack gas (dry basis)	
Measured/Calculated /Default	calculated	
Source of data	From inlet QMS and an analyzing result report	
Value(s) of monitored parameter	28.780 g/mole (determined on Jan. 25, 2012) 28.680 g/mole (determined on Mar. 18, 2012) M <sub>d,in</sub> , M <sub>d,out</sub> , B <sub>ws,in</sub> , B <sub>ws,out</sub> , M <sub>s,in</sub> and M <sub>s,out</sub> were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.	
Monitoring equipment	inlet QMS	
	Type	Quadruple Mass spectrometry
	Accuracy class	±3%
	Serial number	60321
	Calibration frequency	Once per year
	Date of last Calibration	25/01/2012 (previous) 18/03/2012
	Validity	17/03/2013
Measuring/Reading/Recording frequency	Once per year, at least	
Calculation method (if applicable)	Equation 6 in the applied methodology and relevant clauses thereof. M <sub>d,in</sub> = 1.460[SF <sub>6in</sub> ] + 0.440[CO <sub>2in</sub> ] + 0.320[O <sub>2in</sub> ] + 0.280[N <sub>2in</sub> ] + 0.399[Ar <sub>in</sub> ] + 1.021[SO <sub>2</sub> F <sub>2in</sub> ] + 0.040[He <sub>in</sub> ]	
QA/QC procedures	QMS was calibrated with all components having more than 100 ppmv concentrations in inlet gas, which include SF <sub>6</sub> , CO <sub>2</sub> , O <sub>2</sub> , N <sub>2</sub> , Ar, SO <sub>2</sub> F <sub>2</sub> and He. And the applied value of M <sub>d,in</sub> is higher than the actual maximum value of M <sub>d,in</sub> (rounded up) during the 6 hours measuring period and this makes the emission reduction result more conservative. More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.	
Purpose of data	This data is used for the baseline emission calculation.	
Additional comment		





Data/Parameter	M <sub>d,out</sub>	
Unit	g/mole	
Description	Molecular weight of outlet stack gas (dry basis)	
Measured/Calculated /Default	Calculated	
Source of data	From outlet QMS and an analyzing result report	
Value(s) of monitored parameter	28.680 g/mole (determined on Jan. 25, 2012) 28.680 g/mole (determined on Mar. 18, 2012) M <sub>d,in</sub> , M <sub>d,out</sub> , B <sub>ws,in</sub> , B <sub>ws,out</sub> , M <sub>s,in</sub> and M <sub>s,out</sub> were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.	
Monitoring equipment	outlet QMS	
	Type	Quadruple Mass spectrometry
	Accuracy class	±3%
	Serial number	60320
	Calibration frequency	Once per year
	Date of last Calibration	25/01/2012 (previous) 18/03/2012
	Validity	17/03/2013
Measuring/Reading/ Recording frequency	Once per year, at least	
Calculation method (if applicable)	Equation 7 in the applied methodology and relevant clauses thereof. M <sub>d,out</sub> = 0.440[CO <sub>2out</sub> ] + 0.320[O <sub>2out</sub> ] + 0.280[N <sub>2out</sub> ] + 0.399[Ar <sub>out</sub> ] + 0.040[He <sub>out</sub> ]	
QA/QC procedures	QMS was calibrated with all components having more than 100 ppmv concentrations in outlet gas, which include CO <sub>2</sub> , O <sub>2</sub> , N <sub>2</sub> , Ar and He. And the applied value of M <sub>d,out</sub> is lower than the actual maximum value of M <sub>d,out</sub> (rounded down) during the 6 hours measuring period and this makes the emission reduction result more conservative More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.	
Purpose of data	This data is used for the project emission calculation.	
Additional comment		



<b>Data/Parameter</b>	<b>B<sub>ws,in</sub></b>												
<b>Unit</b>	dimensionless (percentage volume fraction)												
<b>Description</b>	The proportion of water in the inlet gas stream measured using EPA method 4, and used to calculate the inlet gas molecular weight.												
<b>Measured/Calculated/Default</b>	Measured												
<b>Source of data</b>	a measurement report												
<b>Value(s) of monitored parameter</b>	4.1% (determined on Jun. 25, 2012) 5.5% (determined on Mar. 18, 2012) M <sub>d,in</sub> , M <sub>d,out</sub> , B <sub>ws,in</sub> , B <sub>ws,out</sub> , M <sub>s,in</sub> and M <sub>s,out</sub> were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.												
<b>Monitoring equipment</b>	<p>This data was measured by an independent measurement company in accordance with the EPA method.</p> <p>Inlet water proportion analyzer</p> <table border="1"> <tr> <td>Type</td><td>Gas Sampling Analyzer</td></tr> <tr> <td>Accuracy class</td><td>±5%</td></tr> <tr> <td>Serial number</td><td>601023</td></tr> <tr> <td>Calibration frequency</td><td>Once per 2 years</td></tr> <tr> <td>Date of last Calibration</td><td>25/01/2012 (previous) 18/03/2012</td></tr> <tr> <td>Validity</td><td>17/03/2014</td></tr> </table>	Type	Gas Sampling Analyzer	Accuracy class	±5%	Serial number	601023	Calibration frequency	Once per 2 years	Date of last Calibration	25/01/2012 (previous) 18/03/2012	Validity	17/03/2014
Type	Gas Sampling Analyzer												
Accuracy class	±5%												
Serial number	601023												
Calibration frequency	Once per 2 years												
Date of last Calibration	25/01/2012 (previous) 18/03/2012												
Validity	17/03/2014												
<b>Measuring/Reading/Recording frequency</b>	Once per year, at least												
<b>Calculation method (if applicable)</b>	This value was measured by an independent measuring and analyzing company and the entire measurement procedure followed EPA method 4.												
<b>QA/QC procedures</b>	<p>This measurement was done for 6 hours during normal manufacturing conditions. The averaged proportion of water during the 6 hours period is used to calculate the inlet gas stream density.</p> <p>More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.</p>												
<b>Purpose of data</b>	This data is used for the baseline emission calculation.												
<b>Additional comment</b>													



<b>Data/Parameter</b>	$B_{ws,out}$												
<b>Unit</b>	dimensionless (percentage volume fraction)												
<b>Description</b>	The proportion of water in the outlet gas stream measured using EPA method 4, and used to calculate the outlet gas molecular weight.												
<b>Measured/Calculated/Default</b>	Measured												
<b>Source of data</b>	a measurement report												
<b>Value(s) of monitored parameter</b>	3.3% (determined on Jun. 25, 2012) 11.9% (determined on Mar. 18, 2012) $M_{d,in}$ , $M_{d,out}$ , $B_{ws,in}$ , $B_{ws,out}$ , $M_{s,in}$ and $M_{s,out}$ were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.												
<b>Monitoring equipment</b>	<p>This data was measured by an independent measurement company in accordance with the EPA method.</p> <p>outlet water proportion analyzer</p> <table border="1"> <tr> <td>Type</td><td>Gas Sampling Analyzer</td></tr> <tr> <td>Accuracy class</td><td><math>\pm 5\%</math></td></tr> <tr> <td>Serial number</td><td>80-091100-1</td></tr> <tr> <td>Calibration frequency</td><td>Once per 2 years</td></tr> <tr> <td>Date of last Calibration</td><td>25/01/2012 (previous) 18/03/2012</td></tr> <tr> <td>Validity</td><td>17/03/2014</td></tr> </table>	Type	Gas Sampling Analyzer	Accuracy class	$\pm 5\%$	Serial number	80-091100-1	Calibration frequency	Once per 2 years	Date of last Calibration	25/01/2012 (previous) 18/03/2012	Validity	17/03/2014
Type	Gas Sampling Analyzer												
Accuracy class	$\pm 5\%$												
Serial number	80-091100-1												
Calibration frequency	Once per 2 years												
Date of last Calibration	25/01/2012 (previous) 18/03/2012												
Validity	17/03/2014												
<b>Measuring/Reading/Recording frequency</b>	Once per year, at least												
<b>Calculation method (if applicable)</b>	This value was measured by an independent measuring and analyzing company and the entire measurement procedure followed EPA method 4.												
<b>QA/QC procedures</b>	This measurement was done for 6 hours during normal manufacturing conditions. The averaged proportion of water during the 6 hours period is used to calculate the inlet gas stream density. More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.												
<b>Purpose of data</b>	This data is used for the project emission calculation.												
<b>Additional comment</b>													



Data/Parameter	Absolute inlet stack pressure ( $P_{s,in}$ )	
Unit	mmHg	
Description	The inlet stack pressure measured during manufacturing operations	
Measured/Calculated /Default	measured	
Source of data	From inlet annubar	
Value(s) of monitored parameter	862 mmHg This is the average value during the monitoring period. To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of $V_{s,in}$ , $V_{s,out}$ , $Q_{in}$ , $Q_{out}$ , $E_{SF6,in}$ and $E_{SF6,out}$ using each real-time value of $P_{s,in}$ , $P_{s,out}$ , $T_{s,in}$ , $T_{s,out}$ , $P_{avg,in}$ , $P_{avg,out}$ and $SF_6$ concentration and fixed values of $M_{d,in}$ , $M_{d,out}$ , $B_{ws,in}$ , $B_{ws,out}$ , $M_{s,in}$ and $M_{s,out}$ which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.	
Monitoring equipment	(inlet annubar device)	
	Type	Differential Pressure-Pitot tube
	Accuracy class	$\pm 3\%$
	Serial number	69453A
	Calibration frequency	Once per year
	Date of last Calibration	22/09/2011
	Validity	21/09/2012
Measuring/Reading/Recording frequency	This value is monitored for every second and used to calculate $E_{SF6,in}$ .	
Calculation method (if applicable)	Not applicable	
QA/QC procedures	This value is measured in accordance with the EPA guideline.	
Purpose of data	This data is used for the baseline emission calculation.	
Additional comment		



Data/Parameter	Absolute outlet stack pressure ( $P_{s,out}$ )	
Unit	mmHg	
Description	The outlet stack pressure measured during manufacturing operations	
Measured/Calculated /Default	measured	
Source of data	From outlet annubar	
Value(s) of monitored parameter	756 mmHg This is the average value during the monitoring period. To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of $V_{s,in}$ , $V_{s,out}$ , $Q_{in}$ , $Q_{out}$ , $E_{SF6,in}$ and $E_{SF6,out}$ using each real-time value of $P_{s,in}$ , $P_{s,out}$ , $T_{s,in}$ , $T_{s,out}$ , $P_{avg,in}$ , $P_{avg,out}$ and $SF_6$ concentration and fixed values of $M_{d,in}$ , $M_{d,out}$ , $B_{ws,in}$ , $B_{ws,out}$ , $M_{s,in}$ and $M_{s,out}$ which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.	
Monitoring equipment	(outlet annubar device)	
	Type	Differential Pressure-Pitot tube
	Accuracy class	$\pm 3\%$
	Serial number	69453B
	Calibration frequency	Once per year
	Date of last Calibration	04/10/2011
	Validity	03/10/2012
Measuring/Reading/Recording frequency	This value is monitored for every second and used to calculate $E_{SF6,out}$ .	
Calculation method (if applicable)	Not applicable	
QA/QC procedures	This value is measured in accordance with the EPA guideline.	
Purpose of data	This data is used for the project emission calculation.	
Additional comment		



Data/Parameter	Absolute inlet stack temperature ( $T_{s,in}$ )	
Unit	K	
Description	The inlet stack temperature measured during manufacturing operations	
Measured/Calculated /Default	Measured	
Source of data	From inlet annubar	
Value(s) of monitored parameter	320 K This is the average value during the monitoring period. To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of $V_{s,in}$ , $V_{s,out}$ , $Q_{in}$ , $Q_{out}$ , $E_{SF6,in}$ and $E_{SF6,out}$ using each real-time value of $P_{s,in}$ , $P_{s,out}$ , $T_{s,in}$ , $T_{s,out}$ , $P_{avg,in}$ , $P_{avg,out}$ and $SF_6$ concentration and fixed values of $M_{d,in}$ , $M_{d,out}$ , $B_{ws,in}$ , $B_{ws,out}$ , $M_{s,in}$ and $M_{s,out}$ which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.	
Monitoring equipment	(inlet annubar device)	
	Type	Standard Platinum Resistance Thermometer
	Accuracy class	$\pm 3\%$
	Serial number	69453A
	Calibration frequency	Once per year
	Date of last Calibration	22/09/2011
	Validity	21/09/2012
Measuring/Reading/Recording frequency	This value is monitored for every second and used to calculate $E_{SF6,in}$ .	
Calculation method (if applicable)	Not applicable	
QA/QC procedures	This value is measured in accordance with the EPA guideline.	
Purpose of data	This data is used for the baseline emission calculation.	
Additional comment		



Data/Parameter	Absolute outlet stack temperature ( $T_{s,out}$ )	
Unit	K	
Description	The outlet stack temperature measured during manufacturing operations	
Measured/Calculated /Default	Measured	
Source of data	From outlet annubar	
Value(s) of monitored parameter	313 K This is the average value during the monitoring period. To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of $V_{s,in}$ , $V_{s,out}$ , $Q_{in}$ , $Q_{out}$ , $E_{SF6,in}$ and $E_{SF6,out}$ using each real-time value of $P_{s,in}$ , $P_{s,out}$ , $T_{s,in}$ , $T_{s,out}$ , $P_{avg,in}$ , $P_{avg,out}$ and $SF_6$ concentration and fixed values of $M_{d,in}$ , $M_{d,out}$ , $B_{ws,in}$ , $B_{ws,out}$ , $M_{s,in}$ and $M_{s,out}$ which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.	
Monitoring equipment	(outlet annubar device)	
	Type	Standard Platinum Resistance Thermometer
	Accuracy class	$\pm 3\%$
	Serial number	69453B
	Calibration frequency	Once per year
	Date of last Calibration	04/10/2011
	Validity	03/10/2012
Measuring/Reading/Recording frequency	This value is monitored for every second and used to calculate $E_{SF6,out}$ .	
Calculation method (if applicable)	Not applicable	
QA/QC procedures	This value is measured in accordance with the EPA guideline.	
Purpose of data	This data is used for the project emission calculation.	
Additional comment		



Data/Parameter	Velocity head measurement by inlet Annubar device ( $p_{avg,in}$ )	
Unit	mmH <sub>2</sub> O	
Description	The averaged velocity head measurement used to calculate the inlet gas velocity	
Measured/Calculated /Default	Measured	
Source of data	From inlet annubar	
Value(s) of monitored parameter	1.62 mmH <sub>2</sub> O This is the average value during the monitoring period. To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of $V_{s,in}$ , $V_{s,out}$ , $Q_{in}$ , $Q_{out}$ , $E_{SF6,in}$ and $E_{SF6,out}$ using each real-time value of $P_{s,in}$ , $P_{s,out}$ , $T_{s,in}$ , $T_{s,out}$ , $P_{avg,in}$ , $P_{avg,out}$ and SF <sub>6</sub> concentration and fixed values of $M_{d,in}$ , $M_{d,out}$ , $B_{ws,in}$ , $B_{ws,out}$ , $M_{s,in}$ and $M_{s,out}$ which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.	
Monitoring equipment	(inlet annubar device)	
	Type	Differential Pressure-Pitot tube
	Accuracy class	±3%
	Serial number	69453A
	Calibration frequency	Once per year
	Date of last Calibration	22/09/2011
	Validity	21/09/2012
Measuring/Reading/Recording frequency	This value is monitored for every second and used to calculate $E_{SF6,in}$ .	
Calculation method (if applicable)	Not applicable	
QA/QC procedures	This value is measured in accordance with the EPA guideline.	
Purpose of data	This data is used for the baseline emission calculation.	
Additional comment		





<b>Data/Parameter</b>	Velocity head measurement by outlet Annubar device ( $p_{avg,out}$ )												
<b>Unit</b>	mmH <sub>2</sub> O												
<b>Description</b>	The averaged velocity head measurement used to calculate the outlet gas velocity												
<b>Measured/Calculated/Default</b>	Measured												
<b>Source of data</b>	From outlet annubar												
<b>Value(s) of monitored parameter</b>	<p>1.38 mmH<sub>2</sub>O</p> <p>This is the average value during the monitoring period.</p> <p>To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of <math>V_{s,in}</math>, <math>V_{s,out}</math>, <math>Q_{in}</math>, <math>Q_{out}</math>, <math>E_{SF6,in}</math> and <math>E_{SF6,out}</math> using each real-time value of <math>P_{s,in}</math>, <math>P_{s,out}</math>, <math>T_{s,in}</math>, <math>T_{s,out}</math>, <math>P_{avg,in}</math>, <math>P_{avg,out}</math> and SF<sub>6</sub> concentration and fixed values of <math>M_{d,in}</math>, <math>M_{d,out}</math>, <math>B_{ws,in}</math>, <math>B_{ws,out}</math>, <math>M_{s,in}</math> and <math>M_{s,out}</math> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.</p>												
<b>Monitoring equipment</b>	<p>(outlet annubar device)</p> <table border="1"> <tr> <td>Type</td><td>Differential Pressure-Pitot tube</td></tr> <tr> <td>Accuracy class</td><td>±3%</td></tr> <tr> <td>Serial number</td><td>76132A</td></tr> <tr> <td>Calibration frequency</td><td>Once per year</td></tr> <tr> <td>Date of last Calibration</td><td>04/10/2011</td></tr> <tr> <td>Validity</td><td>03/10/2012</td></tr> </table>	Type	Differential Pressure-Pitot tube	Accuracy class	±3%	Serial number	76132A	Calibration frequency	Once per year	Date of last Calibration	04/10/2011	Validity	03/10/2012
Type	Differential Pressure-Pitot tube												
Accuracy class	±3%												
Serial number	76132A												
Calibration frequency	Once per year												
Date of last Calibration	04/10/2011												
Validity	03/10/2012												
<b>Measuring/Reading/Recording frequency</b>	This value is monitored for every second and used to calculate $E_{SF6,out}$ .												
<b>Calculation method (if applicable)</b>	Not applicable												
<b>QA/QC procedures</b>	This value is measured in accordance with the EPA guideline.												
<b>Purpose of data</b>	This data is used for the project emission calculation.												
<b>Additional comment</b>													



<b>Data/Parameter</b>	Inlet gas velocity ( $v_{s,in}$ )
<b>Unit</b>	m/sec
<b>Description</b>	Inlet gas velocity
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	Data processing program
<b>Value(s) of monitored parameter</b>	<p>5.10 m/sec</p> <p>This is the average value during the monitoring period.</p> <p>To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of <math>V_{s,in}</math>, <math>V_{s,out}</math>, <math>Q_{in}</math>, <math>Q_{out}</math>, <math>E_{SF6,in}</math> and <math>E_{SF6,out}</math> using each real-time value of <math>P_{s,in}</math>, <math>P_{s,out}</math>, <math>T_{s,in}</math>, <math>T_{s,out}</math>, <math>P_{avg,in}</math>, <math>P_{avg,out}</math> and <math>SF_6</math> concentration and fixed values of <math>M_{d,in}</math>, <math>M_{d,out}</math>, <math>B_{ws,in}</math>, <math>B_{ws,out}</math>, <math>M_{s,in}</math> and <math>M_{s,out}</math> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.</p>
<b>Monitoring equipment</b>	<p>Not applicable</p> <p>This is a calculated data</p>
<b>Measuring/Reading/Recording frequency</b>	This value is calculated for every second and used to calculate $E_{SF6,in}$ .
<b>Calculation method (if applicable)</b>	<p>Equation 10 in the applied methodology</p> $v_{s,in} = K_p \cdot C_{p,in} \sqrt{P_{avg,in}} \sqrt{\frac{T_{s,in}}{P_{s,in} \cdot M_{s,in}}}$
<b>QA/QC procedures</b>	<p>Any <math>SF_6</math> emitted during periods of times where the gas velocity measured at the inlet decreases by more than 5%, compared to the averaged velocity, is completely discounted from the baseline emission.</p> <p>More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.</p>
<b>Purpose of data</b>	This data is used for the baseline emission calculation.
<b>Additional comment</b>	



<b>Data/Parameter</b>	Outlet gas velocity ( $v_{s,out}$ )
<b>Unit</b>	m/sec
<b>Description</b>	Outlet gas velocity
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	Data processing program
<b>Value(s) of monitored parameter</b>	<p>5.00 m/sec</p> <p>This is the average value during the monitoring period.</p> <p>To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of <math>V_{s,in}</math>, <math>V_{s,out}</math>, <math>Q_{in}</math>, <math>Q_{out}</math>, <math>E_{SF6,in}</math> and <math>E_{SF6,out}</math> using each real-time value of <math>P_{s,in}</math>, <math>P_{s,out}</math>, <math>T_{s,in}</math>, <math>T_{s,out}</math>, <math>P_{avg,in}</math>, <math>P_{avg,out}</math> and <math>SF_6</math> concentration and fixed values of <math>M_{d,in}</math>, <math>M_{d,out}</math>, <math>B_{ws,in}</math>, <math>B_{ws,out}</math>, <math>M_{s,in}</math> and <math>M_{s,out}</math> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.</p>
<b>Monitoring equipment</b>	<p>Not applicable</p> <p>This is a calculated data.</p>
<b>Measuring/Reading/Recording frequency</b>	This value is calculated for every second and used to calculate $E_{SF6,out}$ .
<b>Calculation method (if applicable)</b>	<p>Equation 11 in the applied methodology</p> $v_{s,out} = K_p \cdot C_{p,out} \sqrt{P_{avg,out}} \sqrt{\frac{T_{s,out}}{P_{s,out} \cdot M_{s,out}}}$
<b>QA/QC procedures</b>	<p>Any <math>SF_6</math> emitted during periods of times where the gas velocity measured at the outlet increases by more than 5%, compared to the averaged velocity, is completely discounted from the baseline emission.</p> <p>More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.</p>
<b>Purpose of data</b>	This data is used for the project emission calculation.
<b>Additional comment</b>	



<b>Data/Parameter</b>	Inlet stack volumetric flow rate ( $Q_{in}$ )
<b>Unit</b>	m <sup>3</sup> /sec
<b>Description</b>	Inlet volumetric flow rate
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	Data processing program
<b>Value(s) of monitored parameter</b>	<p>0.49 m<sup>3</sup>/sec</p> <p>This is the average value during the monitoring period.</p> <p>To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of <math>V_{s,in}</math>, <math>V_{s,out}</math>, <math>Q_{in}</math>, <math>Q_{out}</math>, <math>E_{SF6,in}</math> and <math>E_{SF6,out}</math> using each real-time value of <math>P_{s,in}</math>, <math>P_{s,out}</math>, <math>T_{s,in}</math>, <math>T_{s,out}</math>, <math>P_{avg,in}</math>, <math>P_{avg,out}</math> and SF<sub>6</sub> concentration and fixed values of <math>M_{d,in}</math>, <math>M_{d,out}</math>, <math>B_{ws,in}</math>, <math>B_{ws,out}</math>, <math>M_{s,in}</math> and <math>M_{s,out}</math> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.</p>
<b>Monitoring equipment</b>	<p>Not applicable</p> <p>This is a calculated data.</p>
<b>Measuring/Reading/Recording frequency</b>	This value is calculated for every second and used to calculate $E_{SF6,in}$ .
<b>Calculation method (if applicable)</b>	<p>Equation 12 in the applied methodology</p> $Q_{in} = \{(100 - B_{ws,in}) \div 100\} V_{s,in} \cdot A_{in} \left[ \frac{T_{std} \cdot P_{s,in}}{T_{s,in} \cdot P_{std}} \right]$
<b>QA/QC procedures</b>	<p>Any SF<sub>6</sub> emissions measured when the value of the gas flow measured at the inlet of the abatement system during the monitoring period decreases by more than 5%, compared to the baseline flow rate measured, is discounted from the baseline emission.</p> <p>More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.</p>
<b>Purpose of data</b>	This data is used for the baseline emission calculation.
<b>Additional comment</b>	



<b>Data/Parameter</b>	Outlet stack volumetric flow rate ( $Q_{out}$ )
<b>Unit</b>	m <sup>3</sup> /sec
<b>Description</b>	Outlet volumetric flow rate
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	Data processing program
<b>Value(s) of monitored parameter</b>	<p>1.22 m<sup>3</sup>/sec</p> <p>This is the average value during the monitoring period.</p> <p>To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of <math>V_{s,in}</math>, <math>V_{s,out}</math>, <math>Q_{in}</math>, <math>Q_{out}</math>, <math>E_{SF6,in}</math> and <math>E_{SF6,out}</math> using each real-time value of <math>P_{s,in}</math>, <math>P_{s,out}</math>, <math>T_{s,in}</math>, <math>T_{s,out}</math>, <math>P_{avg,in}</math>, <math>P_{avg,out}</math> and <math>SF_6</math> concentration and fixed values of <math>M_{d,in}</math>, <math>M_{d,out}</math>, <math>B_{ws,in}</math>, <math>B_{ws,out}</math>, <math>M_{s,in}</math> and <math>M_{s,out}</math> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.</p>
<b>Monitoring equipment</b>	<p>Not applicable</p> <p>This is a calculated data</p>
<b>Measuring/Reading/Recording frequency</b>	This value is calculated for every second and used to calculate $E_{SF6,out}$ .
<b>Calculation method (if applicable)</b>	<p>Equation 13 in the applied methodology</p> $Q_{out} = \{(100 - B_{ws,out}) \div 100\} V_{s,out} \cdot A_{out} \left[ \frac{T_{std} \cdot P_{s,out}}{T_{s,out} \cdot P_{std}} \right]$
<b>QA/QC procedures</b>	<p>Any SF6 emissions measured when the value of the gas flow measured at the outlet of the abatement system during the monitoring period increases by more than 5%, compared to the baseline flow rate measured, is discounted from the baseline emission.</p> <p>More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.</p>
<b>Purpose of data</b>	This data is used for the project emission calculation.
<b>Additional comment</b>	



Data/Parameter	Inlet SF <sub>6</sub> concentration	
Unit	ppm	
Description	Inlet SF <sub>6</sub> concentration measured by FTIR	
Measured/Calculated /Default	Measured	
Source of data	From inlet FTIR	
Value(s) of monitored parameter	606.5 ppm This is the average value during the monitoring period. To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of V <sub>s,in</sub> , V <sub>s,out</sub> , Q <sub>in</sub> , Q <sub>out</sub> , E <sub>SF6,in</sub> and E <sub>SF6,out</sub> using each real-time value of P <sub>s,in</sub> , P <sub>s,out</sub> , T <sub>s,in</sub> , T <sub>s,out</sub> , P <sub>avg,in</sub> , P <sub>avg,out</sub> and SF <sub>6</sub> concentration and fixed values of M <sub>d,in</sub> , M <sub>d,out</sub> , B <sub>ws,in</sub> , B <sub>ws,out</sub> , M <sub>s,in</sub> and M <sub>s,out</sub> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.	
Monitoring equipment	Inlet FTIR	
	Type	FT-IR spectrometry
	Accuracy class	±2%
	Serial number	M620
	Calibration frequency	Once per year
	Date of last Calibration	18/01/2012
	Validity	17/01/2013
Measuring/Reading/ Recording frequency	Once per 40 seconds	
Calculation method (if applicable)	Not applicable	
QA/QC procedures	FTIR shall be calibrated in accordance with the Methodology requirement. More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.	
Purpose of data	This data is used for the baseline emission calculation.	
Additional comment		



Data/Parameter	Outlet SF <sub>6</sub> concentration	
Unit	ppm	
Description	Outlet SF <sub>6</sub> concentration measured by FTIR	
Measured/Calculated /Default	Measured	
Source of data	From outlet FTIR	
Value(s) of monitored parameter	<p>2.0 ppm</p> <p>This is the average value during the monitoring period.</p> <p>To comply precisely with US EPA Methods required in both AM0078 and registered PDD and also to monitor “continuously”, actual monitoring was done every second and monitored values were immediately converted by the algorithm in the program of the monitoring system for real-time determination of V<sub>s,in</sub>, V<sub>s,out</sub>, Q<sub>in</sub>, Q<sub>out</sub>, E<sub>SF6,in</sub> and E<sub>SF6,out</sub> using each real-time value of P<sub>s,in</sub>, P<sub>s,out</sub>, T<sub>s,in</sub>, T<sub>s,out</sub>, P<sub>avg,in</sub>, P<sub>avg,out</sub> and SF<sub>6</sub> concentration and fixed values of M<sub>d,in</sub>, M<sub>d,out</sub>, B<sub>ws,in</sub>, B<sub>ws,out</sub>, M<sub>s,in</sub> and M<sub>s,out</sub> which were determined with separated investigation called “experimental setup” in AM0078. Please see more details in the spreadsheet.</p>	
Monitoring equipment	outlet FTIR	
	Type	FT-IR spectrometry
	Accuracy class	±2%
	Serial number	M619
	Calibration frequency	Once per year
	Date of last Calibration	18/01/2012
	Validity	17/01/2013
Measuring/Reading/ Recording frequency	Once per 40 seconds	
Calculation method (if applicable)	Not applicable	
QA/QC procedures	<p>FTIR shall be calibrated in accordance with the Methodology requirement. The average SF<sub>6</sub> concentration in the outlet of the abatement system is lower than 0.1 ppm which is confirmed by sampling &amp; analyzing result implemented through more sensitive FTIR that can detect 0.1ppm of SF<sub>6</sub>. However, considering that the SF<sub>6</sub> detection range of the installed outlet FTIR is 2 ppm, any values below 2 ppm in outlet is counted as 2 ppm for more conservative calculation.</p> <p>More detailed information on QA/QC procedure is included in the Data Management Manual which has been provided to DOE for verification purpose.</p>	
Purpose of data	This data is used for the project emission calculation.	
Additional comment		



Data/Parameter	FC <sub>i,j,y</sub> volume unit per year of natural gas consumed by the abatement device.	
Unit	Nm <sup>3</sup>	
Description	Quantity of natural gas combusted in the abatement process during the year y (From February 1, 2012 to March 31, 2012, for this monitoring purpose.)	
Measured/Calculated /Default	Measured	
Source of data	D.2.5. a LNG flow-meter	
Value(s) of monitored parameter	252,311 Nm <sup>3</sup>	
Monitoring equipment	LNG flow meter	
	Type	LNG flow meter
	Accuracy class	±2% (Grade 2, certified by Youngnam Energy Service)
	Serial number	A037-1111141-034
	Calibration frequency	Once per 8 years
	Date of last Calibration	14/11/2011 22/11/2011
	Validity	21/11/2019
Measuring/Reading/ Recording frequency	Recording Frequency: Once per second Calculating Frequency: Once per the given monitoring period	
Calculation method (if applicable)	Not applicable	
QA/QC procedures	The flow meter will be maintained by Korea Gas Corporation (a public enterprise). The value recorded in the system is 194,245 Nm <sup>3</sup> and the applied value comes from daily log book manually recorded by operators. The latter data recorded by operators has human errors as checking time of the meter cannot be exactly same for everyday. Nevertheless, the latter value is applied as it is higher than the system value. This is one of conservative approaches made for the emission reductions calculation.	
Purpose of data	This data is used for the project emission calculation.	
Additional comment		





<b>Data/Parameter</b>	WC,i,y
<b>Unit</b>	tC/tLNG
<b>Description</b>	Weighted average mass fraction of carbon in natural gas in year y
<b>Measured/Calculated /Default</b>	Default
<b>Source of data</b>	D.2.6. <b>Information provided by Korea Gas Corporation</b>
<b>Value(s) of monitored parameter</b>	0.752 tC/tLNG
<b>Monitoring equipment</b>	Not applicable This is an externally provided data.
<b>Measuring/Reading/Recording frequency</b>	Once per year (Last measurement conducted on Aug. 20, 2011)
<b>Calculation method (if applicable)</b>	Not applicable
<b>QA/QC procedures</b>	This is a standard value provided by Korea Gas Corporation and an official letter from Korean Gas Corporation regarding the above value has been provided to the DOE for verification purpose.
<b>Purpose of data</b>	This data is used for the project emission calculation.
<b>Additional comment</b>	

<b>Data/Parameter</b>	$\rho_i, y$
<b>Unit</b>	t natural gas/ m3 natural gas
<b>Description</b>	Weighted average density of natural gas in year y
<b>Measured/Calculated /Default</b>	Default
<b>Source of data</b>	D.2.7. <b>Korea Gas Corporation</b>
<b>Value(s) of monitored parameter</b>	$0.7976 * 10^{-3}$ t natural gas/ m3 natural gas
<b>Monitoring equipment</b>	Not applicable This is an externally provided data.
<b>Measuring/Reading/Recording frequency</b>	Once per year (Last measurement conducted on Aug. 20, 2011)
<b>Calculation method (if applicable)</b>	Not applicable
<b>QA/QC procedures</b>	This is a standard value provided by Korea Gas Corporation and an official letter from Korean Gas Corporation regarding the above value has been provided to the DOE for verification purpose.
<b>Purpose of data</b>	This data is used for the project emission calculation.
<b>Additional comment</b>	



<b>Data/Parameter</b>	EC <sub>y</sub>
<b>Unit</b>	kWh
<b>Description</b>	Electricity Consumption in year y (From February 1, 2012 to March 31, 2012, for this monitoring purpose.)
<b>Measured/Calculated /Default</b>	Measured
<b>Source of data</b>	D.2.8. <b>Logbooks and 6 electricity meters</b>
<b>Value(s) of monitored parameter</b>	566,800 kWh



<b>Monitoring equipment</b>	<b>Meter #1</b>	
	Type	Main Electric meter
	Accuracy class	$\pm 2\%$ (Grade 2, Certified by KEPCO)
	Serial number	10960476
	Calibration frequency	Once per 7 years
	Date of last Calibration	14/04/2010
	Validity	13/04/2017
	<b>Meter #2</b>	
	Type	380V UPS Electric meter
	Accuracy class	$\pm 2\%$ (Grade 2, Certified by KEPCO)
	Serial number	10809210
	Calibration frequency	Once per 8 years
	Date of last Calibration	14/04/2010
	Validity	13/04/2018
	<b>Meter #3</b>	
	Type	Air Heater Electric meter
	Accuracy class	$\pm 2\%$ (Grade 2, Certified by KEPCO)
	Serial number	18601432
	Calibration frequency	Once per 7 years
	Date of last Calibration	14/04/2011
	Validity	13/04/2018
	<b>Meter #4</b>	
	Type	Heat Tracing Electric meter
	Accuracy class	$\pm 2\%$ (Grade 2, Certified by KEPCO)
	Serial number	18002831
	Calibration frequency	Once per 7 years
	Date of last Calibration	14/04/2011
	Validity	13/04/2018
	<b>Meter #5</b>	
	Type	Office Electric meter
	Accuracy class	$\pm 2\%$ (Grade 2, Certified by KEPCO)
	Serial number	18002824
	Calibration frequency	Once per 7 years
	Date of last Calibration	14/04/2011
	Validity	13/04/2018
<b>Measuring/Reading/Recording frequency</b>	Recording Frequency: Once per second Calculating Frequency: Once per the given monitoring period	
<b>Calculation method (if applicable)</b>	Not applicable	

<b>QA/QC procedures</b>	Data from logbooks and electrically gathered data from each electricity meter may be different from each other due to communication noise or transmission errors. If both data do not perfectly match, higher value shall be applied for more conservative outcome. Daily log book data (566,800kWh) manually recorded by operators is greater than the value recorded in the system 566,795 kWh. The greater value is applied for conservativeness.
<b>Purpose of data</b>	This data is used for the project emission calculation.
<b>Additional comment</b>	

### D.3. Implementation of sampling plan

>>

Sampling plan has been implemented as it should be.

## SECTION E. Calculation of emission reductions or GHG removals by sinks

### E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

>>

The Baseline emissions calculation is as follows ;

$$BE_{in,y} = k \cdot E_{SF6,y} \cdot GWP_{SF6} \quad ; \text{Equation (1) in the methodology}$$

Facility	$E_{SF6,y}$ (Feb 01, 2012~Mar 31, 2012)	k	$GWP_{SF6}$	$BE_{in,y}$ (Feb 01, 2012~Mar 31, 2012)
P6	3.7301	0.9918	23,900	88,415
P7	7.7471	0.7645	23,900	141,560

where

;Equation (4) in the methodology

$$k = \begin{cases} 1 & ; SF_{6,ratio} \geq C_{SF6,y} \div SP_{project,y} \\ \frac{SF_{6,ratio}}{C_{SF6,y} \div SP_{project,y}} & ; SF_{6,ratio} < C_{SF6,y} \div SP_{project,y} \end{cases}$$

Facility	$SF_{6,ratio}$	$C_{SF6,y}$	$SP_{project,y}$	k
P6	0.0000134193	8.845	653,715	0.9918
P7	0.0000099963	19.383	1,482,492	0.7645

where

$$SF_{6,ratio} = \min(C_{SF6,-1} \div SP_{-1}; C_{SF6,-2} \div SP_{-2}; C_{SF6,-3} \div SP_{-3}) \quad ; \text{Equation (3) in the methodology}$$

Facility	$C_{SF6,-3}$	$C_{SF6,-2}$	$C_{SF6,-1}$	$SP_{-3}$	$SP_{-2}$	$SP_{-1}$	$SF_{6,ratio}$
P6	9.045	12.163	12.496	670,488	863,401	931,203	0.0000134193
P7	4.006	11.522	16.140	400,767	989,628	1,239,257	0.0000099963

And

$$E_{SF6,y} = \min \{ E_{SF6in,y}, 0.48 \times C_{SF6,y}, 0.48 \times C_{SF6,hist} \} \quad ; \text{Equation (2) in the methodology}$$

Facility	$E_{SF6,in,y}$ (Feb 01, 2012~Mar 31, 2012)	$0.48 \times$ $C_{SF6,y}$	$C_{SF6,y}$ (Feb 01, 2012~Mar 31, 2012)	$0.48 \times$ $C_{SF6,hist}$	$C_{SF6,hist}$	$E_{SF6,y}$ (Feb 01, 2012~Mar 31, 2012)
P6	3.7301	4.2457	8.8452	5.9981	12.4961	3.7301
P7	9.6068	9.3040	19.3833	7.7471	16.1398	7.7471

where

$$E_{SF6in,y} = \text{annual( periodic) sum of } E_{SF6,in}$$

$E_{SF6,in}$  is automatically calculated for every second by the data processing program in accordance with the methodology and daily sum of  $E_{SF6,in}$  is also recorded in a form of electronic files along with other values of key parameters used in the  $E_{SF6,in}$  calculation. The O&M team records the daily sum in a logbook and periodically reports a weekly and a monthly sums of  $E_{SF6,in}$  to the project participants. The followings are the formulas used in the calculation.

$$M_{d,in} = 1.460[SF_{6in}] + 0.440[CO_{2in}] + 0.320[O_{2in}] + 0.280[N_{2in}] + 0.399[Ar_{in}] + 1.021[SO_2F_{2in}] + 0.040[He_{in}]$$

;Equation (6) in the methodology modified in accordance with the relevant clauses thereof

$$M_{s,in} = M_{d,in} \cdot (100 - B_{ws,in}) \div 100 + 0.18B_{ws,in} \quad ; \text{Equation (8) in the methodology}$$

$$v_{s,in} = K_p \cdot C_{p,in} \sqrt{P_{avg,in}} \sqrt{\frac{T_{s,in}}{P_{s,in} \cdot M_{s,in}}} \quad ; \text{Equation (10) in the methodology}$$

$$Q_{in} = \{(100 - B_{ws,in}) \div 100\} V_{s,in} \cdot A_{in} \left[ \frac{T_{std} \cdot P_{s,in}}{T_{s,in} \cdot P_{std}} \right] \quad ; \text{Equation (12) in the methodology}$$

$$E_{SF6in} = 65.18Q_{in}[SF_{6in}] \quad ; \text{Equation (14) in the methodology}$$

## E.2. Calculation of project emissions or actual net GHG removals by sinks

>>

The Project emissions calculation is as follows ;

$$PE_y = BE_y (1 - DRE_y) + C_{CO2,y} \quad ; \text{Equation (17) in the methodology}$$

Facility	$BE_y$ (Feb 01, 2012~Mar 31, 2012)	$DRE_y$ (Feb 01, 2012~Mar 31, 2012)	$C_{CO2,y}$ (Feb 01, 2012~Mar 31, 2012)	$PE_y$ (Feb 01, 2012~Mar 31, 2012)
P6	88,415	0.9849	224	1,559
P7	141,560	0.9920	475	1,610

Where

$$DRE_y = 1 - \frac{E_{SF6,out,y}}{E_{SF6,in,y}} \quad ; \text{Equation (16) in the methodology}$$

Facility	$E_{SF6,in,y}$ (Feb 01, 2012~Mar 31, 2012)	$E_{SF6,out,y}$ (Feb 01, 2012~Mar 31, 2012)	$DRE_y$ (Feb 01, 2012~Mar 31, 2012)
P6	3.7301	0.0563	0.9849
P7	9.6068	0.0770	0.9920

where

$$E_{SF6,out,y} = \text{annual( periodic) sum of } E_{SF6,out}$$

As well as  $E_{SF6,in}$ ,  $E_{SF6,out}$  is automatically calculated for every second by the data processing program in accordance with the methodology and daily sum of  $E_{SF6,out}$  is also recorded in a form of electronic files along with other values of key parameters used in the  $E_{SF6,out}$  calculation. The O&M team records the daily sum in a logbook and periodically reports a weekly and a monthly sum of  $E_{SF6,out}$  to the project participants. The followings are the formulas used in the calculation.

$$M_{d,out} = 0.440[CO_{2,out}] + 0.320[O_{2,out}] + 0.280[N_{2,out}] + 0.399[Ar_{out}] + 0.040[He_{out}]$$

;Equation (7) in the methodology modified in accordance with the relevant clauses thereof

$$M_{s,out} = M_{d,out} \cdot (100 - B_{ws,out}) \div 100 + 0.18B_{ws,out} \quad ; \text{Equation (9) in the methodology}$$

$$v_{s,out} = K_p \cdot C_{p,out} \sqrt{P_{avg,out}} \sqrt{\frac{T_{s,out}}{P_{s,out} \cdot M_{s,out}}} \quad ; \text{Equation (11) in the methodology}$$

$$Q_{out} = \{(100 - B_{ws,out}) \div 100\} V_{s,out} \cdot A_{out} \left[ \frac{T_{std} \cdot P_{s,out}}{T_{s,out} \cdot P_{std}} \right] \quad ; \text{Equation (13) in the methodology}$$

$$E_{SF6,out} = 65.18 Q_{out} [SF_{6,out}] \quad ; \text{Equation (15) in the methodology}$$

And  $C_{CO2,y}$  (for the period beginning from September 1,2011 and ending at January 31,2012) is calculated as follows;

$$C_{CO2,y} = tCO2_{electricity,y} + tCO2_{LNG,y}$$

Where,

$tCO2_{electricity,y}$ : GHG emission from electricity consumption by the abatement system during the monitoring period (tCO2)

$tCO2_{LNG,y}$ : GHG emission from LNG consumption by the abatement system during the monitoring period (tCO2)



Facility	tCO <sub>2</sub> <sub>electricity,y</sub> (Feb 01, 2012~Mar 31, 2012)	tCO <sub>2</sub> <sub>LNG,y</sub> (Feb 01, 2012~Mar 31, 2012)	C <sub>CO<sub>2</sub>,y</sub> (Feb 01, 2012~Mar 31, 2012)
P6	107	117	224
P7	324	151	475

where

$$tCO_{2,electricity,y} = EC_y \cdot EF_{grid,CM,y}$$

Facility	EC <sub>y</sub> (Feb 01, 2012~Mar 31, 2012)	EF <sub>grid,CM,y</sub>	tCO <sub>2</sub> <sub>electricity,y</sub> (Feb 01, 2012~Mar 31, 2012)
P6	187.595	0.5708	107
P7	566.800	0.5708	324

And where

$$tCO_{2,LNG,y} = FC_{i,j,y} \cdot wc_{i,y} \cdot \rho_{i,y}$$

Facility	FC <sub>i,j,y</sub> (Feb 01, 2012~Mar 31, 2012)	wc <sub>i,y</sub>	ρ <sub>i,y</sub>	tCO <sub>2</sub> <sub>LNG,y</sub> (Feb 01, 2012~Mar 31, 2012)
P6	194,245	0.752	0.0007976	117
P7	252,311	0.752	0.0007976	151

### E.3. Calculation of leakage

>>

According to the methodology applied, there is no leakage from the project activity.

### E.4. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks

Time Period	Baseline emissions or baseline net GHG removals by sinks (tCO <sub>2</sub> e)	Project emissions or actual net GHG removals by sinks (tCO <sub>2</sub> e)	Leakage (tCO <sub>2</sub> e)	Emission reductions or net anthropogenic GHG removals by sinks (tCO <sub>2</sub> e)
<b>Total</b>	229,975	3,169	0	226,806
<b>(P6)</b>	88,415	1,559	0	86,856
<b>(P7)</b>	141,560	1,610	0	139,950

The Emission reductions calculation is as follows ;

$$ER_y = BE_y - PE_y$$

;Equation (18) in the methodology

### E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (tCO <sub>2</sub> e)	162,745	226,806
(P6)	81,220 (equivalent to 60/365 of 494,087 tCO <sub>2</sub> e which is the reduction estimated for the Year 1.)	86,856
(P7)	81,525 (equivalent to 60/365 of 495,943 tCO <sub>2</sub> e which is the reduction estimated for the Year 1.)	139,950

### E.6. Remarks on difference from estimated value in registered PDD

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According to the methodology applied, actually measured data should be used for calculation emission reductions. However, at the time of requesting registration for the PDD of this project activity, the abatement system in Plant 6 was under construction so there was no way to obtain reliable data necessary to calculate emission reductions to be achieved by this project. Instead, to estimate emission reductions acceptable to the CDM Executive Board and satisfactory to its criteria, the project participants used IPCC default values. In the registered PDD, SF<sub>6</sub> etch utilization efficiency of 70% and heel value of 10% is applied for estimating emission reductions, particularly calculations of E<sub>SF<sub>6</sub>,in</sub> and E<sub>SF<sub>6</sub>,out</sub>. IPCC default values, including aforementioned values, are generally more conservative than reasonably expected values; therefore, it is not an unexpected result that the actually measured emission reduction is higher than the estimated figures in the PDD. The following table shows differences between IPCC default values used in the ex-ante emission reductions calculation of the registered PDD and the actual values achieved through project implementation.

Parameters	IPCC default value /Assumed value	Actual Value	Effect on the emission reductions
C <sub>SF<sub>6</sub>,y</sub> (P6)	14,188 kg (60/365 of the annual value, 86,313 kg derived from the biz plan)	8,845 kg	The actual value is lower than the business plan set up in 2009. This decrease led to small decrease of the baseline emission.
C <sub>SF<sub>6</sub>,y</sub> (P7)	14,336 kg (60/365 of the annual value, 87,212 kg derived from the biz plan)	19,383 kg	The actual value is higher than the business plan set up in 2009. This increase led to small increase of the baseline emission.





SF6 etch utilization efficiency (P6)	70.0%	57.8%	Actual value is lower than IPCC default value. While the methodology used 60% SF6 utilization efficiency and 20% uncertainty (equation 2), the more conservative value of 70% (Tier2.b) was used for the calculation of $E_{SF6,in,y}$ in the PDD to ensure conservativeness on projection. The lower value of utilization efficiency led to greater baseline emission as it directly affect to the mass of SF6 entering into the system. In case of P7, while $E_{SF6,in,y}$ is higher than $0.48 \cdot C_{SF6,hist}$ in the PDD, $E_{SF6,in,y}$ is greater than $0.48 \cdot C_{SF6,hist}$ due to the decreased SF6 etch utilization efficiency and $0.48 \cdot C_{SF6,hist}$ becomes $E_{SF6,in}$ of this monitoring period. This is a major reason of the increase.
SF6 etch utilization efficiency (P7)	70.0%	50.4%	
heel value (P6 & P7)	10%	10%	In this monitoring report, 10% heel value is used although the actual heel value recorded (6.0%) is much lower than 10%. It was done for a conservative approach to the emission reductions.
DRE (P6)	90.00%	98.49%	90% DRE was used for the ex-ante calculation as it is generally used in performance projection of uninstalled systems. Therefore it is easily expected that the actual performance of installed systems should be different from the projection. The applied system has much higher DRE and it led to the smaller project emission.
DRE (P7)	90.00%	99.20%	

In the PDD, The value of  $E_{SF6,in,y}$  was calculated by multiplying SF6 etch utilization efficiency of 70% and heel value of 10% to Expected  $C_{SF6,y}$  while  $E_{SF6,out,y}$  was simply derived by multiplying DRE of 10% to  $E_{SF6,in,y}$ . This calculation was a kind of reverse operation and used only for the ex-ante calculation purpose.

The following table shows values of  $E_{SF6,in,y}$  and  $E_{SF6,out,y}$  projected in the PDD and the real achievement. The differences between values are caused by the abovementioned conservative projection.



Parameters		Projected in the PDD	Real achievement
P6	$E_{SF6,in,y}$	3,830.9 kg (60/365 of the estimated value on annual basis, 23,305 kg)	3,730.1 kg
	$E_{SF6,out,y}$	383.0 kg (60/365 of the estimated value on annual basis, 2,330 kg)	56.3 kg
P7	$E_{SF6,in,y}$	3,871.2 kg (60/365 of the estimated value on annual basis, 23,550 kg)	9,606.8 kg
	$E_{SF6,out,y}$	387.1 kg (60/365 of the estimated value on annual basis, 2,355 kg)	77.0 kg

In conclusion, the increase of emission reductions achieved during the monitoring period is mainly caused by the conservative SF6 etch utilization efficiency used in the ex-ante calculation of the PDD and higher actual DRE of the applied system.

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#### History of the document

Version	Date	Nature of revision
02.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	EB 54, Annex 34 28 May 2010	Initial adoption.
<b>Decision Class:</b> Regulatory <b>Document Type:</b> Form <b>Business Function:</b> Issuance		