QUESTIONNAIRE FOR THE CHEMICAL INDUSTRY (SECTOR-RELATED QUESTIONS)

The completion of this questionnaire is voluntary. However, replying to the relevant questions as completely as possible will facilitate and speed up the assessment of the environmental, social and human rights impacts of the project for which the German export supplies or services offered for cover are intended. This – together with the questionnaire not related to a particular sector, the completion and submission of which should also be considered in order to speed up the assessment procedure – can replace the description of the environmental, social and human rights impacts in the memorandum.

The questionnaire provides guidance on what information may be important for this sector. It is based on the World Bank/IFC General Environmental Health and Safety (EHS) Guidelines, the EHS Guidelines for Coal Processing and the EHS Guidelines for Large Volume Inorganic Compounds Manufacturing and Coal Tar Distillation. Additional information on the applicable standards can be found at the AGA Portal.

This is a list of possible questions. Depending on the individual case only some of them, or perhaps also additional information, may become relevant in the course of the application procedure. Because of the specific features of each project further clarification may be required.

CONTENT

A. Coal processing

A.1. Process and resources consumption

- Please give a technical description of the individual process steps (processing of coal into gaseous or liquid chemicals, including fuels, production of synthetic gas (SynGas), direct hydrogenation of coal into liquid hydrocarbons, etc.).
- Does a production-related connection with other (planned) facilities (e.g. coal mining) exist?
- How is the planned plant supplied with energy and raw materials?
- What raw materials are required and where are they sourced?
- How are the finished goods transported away from the site?
- Please state the planned plant's energy consumption after the project's completion in accordance with the table below.

Resource and Energy Consumption			
	Unit	**Industry Benchmark**	**Project Value**
Electric power consumption of Coal-to-Liquid plants	MWhr/ Metric Ton of total Coal-to-Liquid products	0.05 – 0.1	
Electric Power consumption of methanol plants	MWhr/Metric Ton of methanol	0.07	
Source: WORLD BANK/IFC EHS Guidelines for COAL PROCESSING 2007, page 14			

A.2. Air emissions

- Please state the expected values for air emissions after the project's completion for all process steps in accordance with the table below. Occasionally, not all pollutants listed in the table are emitted or others specific to the project have to be added. Please inform us if that is the case.

Air Emissions Levels for Coal Processing Plants			
Pollutant	**Unit**	**Guideline Value**	**Project Value**
Coal Preparation Plant			
Thermal Dryer Particulate	mg/Nm³	70	
Thermal Dryer Gas Opacity	%	20	
Pneumatic Coal Cleaning Equip. Particulate	mg/Nm³	40	
Pneumatic Coal Cleaning Equip. Opacity	%	10	
Conveying, Storage and Preparation Gas Opacity	%	10	
Overall			
SO_2	mg/Nm³	150 – 200	
NO_X	mg/Nm³	200 – 400[1]	
Hg	mg/Nm³	1.0	
Particulate Matter	mg/Nm³	30 – 50[1]	
VOC	mg/Nm³	150	
Total Heavy Metals	mg/Nm³	1.5	
H_2S	mg/Nm³	10[2]	
COS + CS_2	mg/Nm³	3	
Ammonia	mg/Nm³	30	

Notes:
[1] Lower value for plants of >100 MWth equivalent, higher value for plants of <100 MWth equivalent.
[2] Emissions from Claus unit (Austria, Belgium, Germany).
- Process emissions levels should be reviewed in consideration of utility source emissions to arrive at the lowest overall emission rate for the facility.
- Dry gas 15% O_2

Source: WORLD BANK/IFC EHS Guidelines for COAL PROCESSING 2007, page 14

- Please also state the (expected) emission values (in particular greenhouse gas emissions (CO_{2eq}), dust (PM), sulfur dioxide (SO_2) and nitrogen oxides (NO_x) in mg/Nm³) for any steam and power generation. In the case of plants with a capacity of more than 50 $MW_{thermic}$ please use the questionnaire *Conventional Energy* as guideline.
- Please state the emissions after the project's completion also in accordance with the table below. Occasionally, not all pollutants listed in the table are emitted or others specific to the project have to be added. Please inform us if that is the case.

Emisssions[1]			
Parameter	**Unit**	**Industry Benchmark**	**Project Value**
SO_2	g/Nm³ of SynGas	0.3 – 0.5	
SO_2 (Coal-Methanol-Gasoline)[4]	tons/day	6 – 14	
SO_2 (Fischer-Tropsch)[4]	tons/day	9 – 14	
NO_X	g/Nm³ of SynGas	0.35 – 0.6	
NO_X (Coal-Methanol-Gasoline)[4]	tons/day	5 – 15.5	
NO_X (Fischer-Tropsch[4]	tons/day	5 – 23.6	
Particulate Matter 10	g/Nm³ of SynGas	0.12	
Particulates (Coal-Methanol-Gasoline)[4]	tons/day	0.5 – 7.5	
Particulates (Fischer-Tropsch)[4]	tons/day	1 – 6	
CO_2 [2 3]	kg/kg of coal	1.5	
CO_2 (Coal-Methanol-Gasoline and Fischer-Tropsch)[4]	tons/day	21,000	
Ammonia	g/Nm³ of SynGas	0.004	

Notes:
[1] Production: 1,300 – 1,500 Nm^3 of SynGas/t of coal
[2] According to rank and grade of coal; calculated for a GHP = 30 GJ/kg
[3] Without carbon capture and sequestration (CCS)
[4] Reference: Edgar, T.F. (1983). For a 50,000 bbl/day coal liquefaction facility

Source: WORLD BANK/IFC EHS Guidelines for COAL PROCESSING 2007, page 15

- How high are the expected greenhouse gas emissions (CO_2 equivalents for scope 1+2) in tons/year?
- Please describe what measures are taken to avoid/reduce emissions from the site.
- Please describe the method of venting and flaring gases used. Are any gases additionally released into the environment, except in cases of emergency venting? If gas flaring does not take place, reasons should be given.
- What limit values for ambient air quality are applicable in the buyer's country (please make a table available)? Please state the relevant expected emission levels. Please comment on any changes in the ambient air quality before and after the project implementation. If there are no national limit values, please use the table below.

WHO Ambient Air Quality Guidelines[1,2]					
	Averaging Period	**IFC Guideline Value [µg/m³]**	**Guideline Value Host country**	**Project Value (baseline status) [µg/m³]**	**Project Value (after imple-mentation) [µg/m³]**
Sulfur dioxide (SO_2)	24-hour	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)			
	10 minute	500 (guideline)			
Nitrogen dioxide (NO_2)	1-year	40 (guideline)			
	1-hour	200 (guideline)			
Particulate Matter (PM_{10})	1-year	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)			
	24-hour	150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)			
Particulate Matter ($PM_{2.5}$)	1-year	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline)			
	24-hour	75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)			
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)			
Notes: [1] World Health Organization (WHO). Air Quality Guidelines Global Update, 2005. PM 24-hour value is the 99th percentile. [2] Interim targets are provided in recognition of the need for a staged approach to achieving the recommended guidelines.					
Source: WORLD BANK/IFC GENERAL EHS GUIDELINES 2007, page 4					

- Please describe the on-site monitoring of air emissions as well as ambient air quality levels.

A.3. Fresh water and effluents

- How much (fresh) water is used on site? Is the water recirculated?
- Where and how is the water withdrawn?
- What wastewater streams are generated?
- How are effluents treated on site? Please also state whether effluents are discharged into a public sewage treatment system or into surface water bodies (river, lake, sea). If there are discharges, please provide information on the quantities of the wastewater streams (e.g. m^3/h or l/s).
- If wastewater is discharged directly into a surface water body, please state the values of the wastewater's pollution level in mg/l in accordance with the table below. Occasionally, not all pollutants listed in the table are emitted or others specific to the project have to be added. Please inform us if that is the case.

Effluents Levels for Coal Processing Plants			
Pollutant	**Unit**	**Guideline Value**	**Project Value**
pH	S.U.	6 – 9	
BOD_5	mg/L	30	
COD	mg/L	150 (40 cooling water)	
Ammoniacal nitrogen (as N)	mg/L	5	
Total nitrogen	mg/L	10	
Total phosphorus	mg/L	2	
Sulfide	mg/L	1	
Oil and grease	mg/L	10	
TSS	mg/L	35	
Total metals	mg/L	3	
Cadmium	mg/L	0.1	
Chromium (total)	mg/L	0.5	
Chromium (hexavalent)	mg/L	0.1	
Copper	mg/L	0.5	
Cobalt	mg/L	0.5	
Zinc	mg/L	1	
Lead	mg/L	0.5	
Iron	mg/L	3	
Nickel	mg/L	1	
Mercury	mg/L	0.02	
Vanadium	mg/L	1	
Manganese	mg/L	2	

Phenol	mg/L	0.5	
Cyanides	mg/L	0.5	
Source: WORLD BANK/IFC EHS Guidelines for COAL PROCESSING 2007, page 14			

- Please describe the measures planned to avoid/reduce/treat wastewater.
- Please describe the on-site monitoring of the effluent values.
- How and where are the effluents discharged? Please explicitly comment on a temperature rise at the point of discharge, describe possible effects of the discharge on the ecology of the water bodies and provide information on the condition and size of the water body (e.g. flow values, flow rate). Please give also details on protection measures.
- What national standards are applicable in the buyer's country for the discharge of sanitary sewage? How is sewage treated before it is discharged? Please state the expected values of the pollution levels in the sewage. If there are no national limit values, please use the table below.

Indicative Values for Treated Sanitary Sewage Discharges[1]			
Pollutants	**Units**	**Guideline Value**	**Project Value**
pH	pH	6-9	
BOD	mg/L	30	
COD	mg/L	125	
Total nitrogen	mg/L	10	
Total phosphorus	mg/L	2	
Oil and grease	mg/L	10	
TSS	mg/L	50	
Total coliform bacteria	MPN[2]/100 ml	400[1]	
Notes: [1] Not applicable to centralized, municipal, wastewater treatment systems which are included in EHS Guidelines for Water and Sanitation. [2] MPN = Most Probable Number			
Source: WORLD BANK/IFC GENERAL EHS GUIDELINES 2007, page 30			

A.4. Noise

- How far is the nearest residential area away?
- Are noise mitigation measures necessary or planned? If so, what measures?
- Please state the noise impact (existing background noise level and additional noise emissions of the project) on the nearest receptors (industrial estates and residential areas) in dB(A) for day and night after completion of the project in accordance with the table below.

Noise Level Guidelines[1]				
	One Hour LA_{eq} (dBA)			
Receptor	**Guideline Value Daytime (07:00-22:00)**	**Project Value Daytime (07:00-22:00)**	**Guideline Value Nighttime (22:00-07:00)**	**Project Value Nighttime (22:00-07:00)**
Residential; institutional; educational[2]	55		45	
Industrial; commercial	70		70	
Notes: [1] Guidelines values are for noise levels measured out of doors. Source: Guidelines for Community Noise, WHO, 1999. [2] For acceptable indoor noise levels for residential, institutional, and educational settings refer to WHO (1999).				
Source: WORLD BANK/IFC GENERAL EHS GUIDELINES 2007, page 53				

- Do the project's noise emissions lead to an increase of the background noise level at the nearest receptors by more than 3 dB(A)?

A.5. Waste

- What relevant waste products are generated on site?
- Please state the amount of waste generated after the project's completion in accordance with the table below.

Waste Generation[1]			
Parameter	**Unit**	**Industry Benchmark**	**Project Value**
Solid Waste (ash, slag and sulfur)[2]	Kg/ton of coal	50–200	
Notes: [1] Production: 1,300 – 1,500 Nm 3 of SynGas/t of coal [2] According to rank and grade of coal; calculated for a GHP = 30 GJ/kg			
Source: WORLD BANK/IFC EHS Guidelines for COAL PROCESSING 2007, page 15			

- What measures are taken to avoid, treat and dispose of the waste (solid/liquid) generated and where/how is it deposited?
- Please give also details on possible waste incineration processes (type and quantity of waste, incineration temperature, etc.).

A.6. Occupational health and safety

- What safety measures and/or control systems are planned to prevent accidents?
- How are safety and health (in particular with regard to process safety, oxygen-enriched and oxygen-deficient atmospheres, inhalation hazards due to dust, etc., gas releases, fire and explosions) guaranteed at the workplace?
- What average and maximum noise exposure is to be expected at the workplaces? What safety measures are taken at workplaces where the noise exposure exceeds 85 dB(A)?
- How are subcontractors integrated into the health and safety measures on site?
- Please make accident statistics for the past two years available to us.

A.7. Health and safety of the population

- What measures are taken to minimize impacts and possible risks for adjacent communities in particular with regard to the storage and transport of hazardous materials, noise, odours, dust, and/or increased traffic?
- Please make information on infrastructure links (access roads, railway link, etc.), which may be necessary, available to us.

B. Large volume inorganic compounds manufacturing

B.1. Process and resources consumption

- Please state what kind of products will be produced at the site (e.g. ammonia, acids [nitric acid, hydrochloric acid, sulphuric acid, hydrofluoric acid, phosphoric acid], chlor-alkali chemicals [e.g. chlorine, caustic soda, soda ash], carbon black, etc.).
- Please give a technical description of the individual process steps for the plant as a whole.
- Does a production-related connection with other (planned) facilities exist?
- How is the planned plant supplied with energy and raw materials (e.g. by ship)? What raw materials are required and where are they sourced?
- How are the finished goods transported away from the site?
- Please state the resources consumption after the project's completion in accordance with the table below.

Resource and Energy Consumption			
Product	**Unit**	**Industry Benchmark**	**Project Value**
Ammonia	GJ lower heating value (LHV)/tonne NH_3	28.8 to 31.5[1]	
Phosphoric Acid	Tonne phosphate rock/tonne P_2O_5	2.6 – 3.5[1]	
	KWh/tonne P_2O_5	120 - 180[1]	
	m^3 cooling water/tonne HF	100 - 150[1]	
Hydrofluoric Acid	Tonne CaF_2/tonne HF	2.1 – 2.2[4]	
	Tonne H_2SO_4/tonne HF	2.6 – 2.7[4]	
	KWh/tonne HF	150 - 30[4]	
Chlor-Alkali	KWh/tonne Cl_2	3,000 without Cl liquefaction 3,200 with Cl liquefaction / evaporation[3]	
	Tonne NaCl/tonne Cl_2	1.75[3]	
	g Hg/tonne of chlorine capacity (mercury cell plants)	0.2 – 0.5[3]	

Soda Ash	GJ/tonne soda ash	9.7 – 13.6[2]	
	Tonne limestone/tonne soda ash	1.09 – 1.82[2]	
	Tonne NaCl/tonne soda ash	1.53 – 1.80[2]	
	m³ cooling water/tonne soda ash	50 – 100[2]	
Carbon Black	KWh/tonne carbon black	430 – 550[2]	
	GJ/tonne carbon black	1.55 – 2[2]	

Notes:
[1] European Fertilizer Manufacturers' Association (EFMA). 2000.
[2] EU IPPC - Reference Document on Best Available Techniques in Large Volume Inorganic Chemicals - Solid and Others industry. December 2006.
[3] EU IPPC - Reference Document on Best Available Techniques in the Chlor-Alkali Manufacturing industry. December 2001.
[4] EU IPPC - Reference Document on Best Available Techniques in Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilizers Industries. October 2006.

Source: WORLD BANK/IFC EHS Guidelines for LARGE VOLUME INORGANIC COMPOUNDS MANUFACTURING AND COAL TAR DISTILLATION, table 3, page 17

B.2. Air emissions

- Please state the expected values for air emissions after the project's completion for all process steps in accordance with the table below. Occasionally, not all pollutants listed in the table are emitted or others specific to the project have to be added. Please inform us if that is the case.

Air Emissions Levels			
Pollutant	**Unit**	**Guideline Value**	**Project Value**
Ammonia Plant			
NH_3	mg/Nm³	50	
NO_X	mg/Nm³	300	
Particulate Matter	mg/Nm³	50	
Nitric Acid Plants			
NO_X	mg/Nm³	300	
N_2O	mg/Nm³	800	
NH_3	mg/Nm³	10	
Sulfuric Acid Plants			
SO_2	mg/Nm³	450 (2 kg/t acid)	
SO_3	mg/Nm³	60 (0.075 kg/t acid)	
H_2S	mg/Nm³	5	
NO_X	mg/Nm³	200	
Phosphoric / Hydrofluoric Acids Plants			
Fluorides (gaseous) as HF	mg/Nm³	5	
Particulate Matter/CaF2	mg/Nm³	50 (0.10 kg/t phosphate rock)	
Chlor-Alkali / Hydrochloric Acid Plants			

Cl_2	mg/Nm³	1 (partial liquefaction) 3 (complete liquefaction	
HCL	ppmv	20	
Hg	mg/Nm³	0.2 (annual average emission of 1 g/t chlorine)	
Soda Ash Plants			
NH_3	mg/Nm³	50	
H_2S	mg/Nm³	5	
NO_X	mg/Nm³	200	
Particulate Matter	mg/Nm³	50	
Carbon Black			
SO_2	mg/Nm³	850	
NO_X	mg/Nm³	600	
CO	mg/Nm³	500	
Particulate Matter	mg/Nm³	30	
VOC	mg/Nm³	50	
Source: WORLD BANK/IFC EHS Guidelines for LARGE VOLUME INORGANIC COMPOUNDS MANUFACTURING AND COAL TAR DISTILLATION, table 1, page 16			

- Please also state the (expected) emission values (in particular greenhouse gas emissions (CO_{2eq}), dust (PM), sulfur dioxide (SO_2) and nitrogen oxides (NO_x) in mg/Nm³) for any steam and power generation. In the case of plants with a capacity of more than 50 $MW_{thermic}$ please use the questionnaire *Conventional Energy* as guideline.
- How high are the expected greenhouse gas emissions (CO_2 equivalents for scope 1+2) in tons/year?
- Please describe what measures are taken to avoid/reduce emissions from the site.
- Please describe the method of venting and flaring gases used. Are any gases additionally released into the environment, except in cases of emergency venting? If gas flaring does not take place, reasons should be given.
- What limit values for ambient air quality are applicable in the buyer's country (please make a table available)? Please state the relevant expected emission levels. Please comment on any changes in the ambient air quality before and after the project implementation. If there are no national limit values, please use the table below.

WHO Ambient Air Quality Guidelines[1,2]					
	Averaging Period	**IFC Guideline Value [µg/m³]**	**Guideline Value Host country**	**Project Value (baseline status) [µg/m³]**	**Project Value (after imple-mentation) [µg/m³]**
Sulfur dioxide (SO_2)	24-hour	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)			
	10 minute	500 (guideline)			
Nitrogen dioxide (NO_2)	1-year	40 (guideline)			
	1-hour	200 (guideline)			
Particulate Matter (PM_{10})	1-year	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)			
	24-hour	150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)			
Particulate Matter ($PM_{2.5}$)	1-year	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline)			
	24-hour	75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)			
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)			
Notes: [1] World Health Organization (WHO). Air Quality Guidelines Global Update, 2005. PM 24-hour value is the 99th percentile. [2] Interim targets are provided in recognition of the need for a staged approach to achieving the recommended guidelines.					
Source: WORLD BANK/IFC GENERAL EHS GUIDELINES 2007, page 4					

- Please describe the on-site monitoring of air emissions as well as ambient air quality levels.

B.3. Fresh water and effluents

- How much (fresh) water is used on site? Is the water recirculated?
- Where and how is the water withdrawn?
- What wastewater streams are generated?
- How are effluents treated on site? Please also state whether effluents are discharged into a public sewage treatment system or into surface water bodies (river, lake, sea). If there are discharges, please provide information on the quantities of the wastewater streams (e.g. m³/h or l/s).
- If wastewater is discharged directly into a surface water body, please state the values of the wastewater's pollution levels in mg/l in accordance with the table below. Occasionally, not all pollutants listed in the table are emitted or others specific to the project have to be added. Please inform us if that is the case.

Effluent Levels			
Pollutant	**Unit**	**Guideline Value**	**Project Value**
pH	S.U.	6 - 9	
temperature increase	°C	<3	
Ammonia Plant			
NH_3	mg/L	10 (0.1 kg/t)[1]	
TSS	mg/L	30	
Nitric Acid Plants			
NH_3	mg/L	10	
Nitrates	g/t	25	
TSS	mg/L	30	
Sulfuric Acid Plants			
Phosphorous	mg/L	5	
Fluoride	mg/L	20	
TSS	mg/L	30	
Phosphoric Acid Plants			
Phosphorous	mg/L	5	
Fluoride	mg/L	20	
TSS	mg/L	30	
Hydrofluoric Acids Plants			
Fluorides	kg/tonne HF	1	
Suspended Solids	kg/tonne HF	1	
	mg/L	30	

Chlor-Alkali /Hydrochloric Acid Plant			
TSS	mg/L	20[2]	
COD	mg/L	150[2]	
AOX	mg/L	0.5[2]	
Sulfides	mg/L	1	
Chlorine	mg/L	0.2[2]	
Mercury	--	0.05 mg/l 0.1 g/t chlorine	
Toxicity to Fish Eggs	T_F	2	
Soda Ash Plants			
Suspended Solids	kg/t	270	
Phosphorous	kg/t	0.2	
TSS	mg/L	30	
Ammonia (as N)	mg/L	10	
Carbon Black			
COD	mg/L	100	
Suspended Solids	mg/L	20	
Notes: [1] Load based guideline: 0.1 kg/t of product 2 Non-asbestos diaphragm plants			
Source: WORLD BANK/IFC EHS Guidelines for LARGE VOLUME INORGANIC COMPOUNDS MANUFACTURING AND COAL TAR DISTILLATION, table 2, page 16			

- Please describe the measures planned to avoid/reduce/treat wastewater.
- Please describe the on-site monitoring of the effluent values.
- How and where are the effluents discharged? Please explicitly comment on a temperature rise at the point of discharge, describe possible effects of the discharge on the ecology of the water bodies and provide information on the condition and size of the water body (e.g. flow values, flow rate). Please give also details on protection measures.
- What national standards are applicable in the buyer's country for the discharge of sanitary sewage? How is sewage treated before it is discharged? Please state the expected values of the pollution levels in the sewage. If there are no national limit values, please use the table below.

Indicative Values for Treated Sanitary Sewage Discharges[1]			
Pollutants	**Units**	**Guideline Value**	**Project Value**
pH	pH	6-9	
BOD	mg/L	30	
COD	mg/L	125	

Total nitrogen	mg/L	10	
Total phosphorus	mg/L	2	
Oil and grease	mg/L	10	
TSS	mg/L	50	
Total coliform bacteria	MPN[2]/100 ml	400[1]	
Notes: [1] Not applicable to centralized, municipal, wastewater treatment systems which are included in EHS Guidelines for Water and Sanitation. [2] MPN = Most Probable Number			
Source: WORLD BANK/IFC GENERAL EHS GUIDELINES 2007, page 30			

B.4. Waste

- What relevant waste products are generated on site?
- Please state the amount of emissions, wastewater and waste generated after the project's completion in accordance with the table below.

Emissions, Effluents and Waste Generation			
Parameter	**Unit**	**Industry Benchmark**	**Project Value**
Ammonia Plant			
CO_2 from process	tonne/tonne NH_3	1.15 – 1.3[1]	
NO_X (advanced conventional reforming processes and processes with reduced primary reforming)	kg/tonne NH_3	0.29 – 0.32	
NO_X (heat exchange autothermal reforming)	kg/tonne NH_3	0.175	
Nitric Acid Plants			
N_2O	kg/tonne 100% HNO_3	0.15 – 0.6[4]	
NO_X	ppmv	5 – 75[4]	
Sulfuric Acid Plants			
SO_2 (Sulfur burning, double contact/double absorption)	mg/Nm³	30 – 350[1 4]	
SO_2 (Single contact/single absorption)	mg/Nm³	100 – 450[4]	
Phosphoric / Hydrofluoric Acid Plants			
Fluorides	mg/Nm³	0.6 – 5[4]	
SO_2	kg/tonne HF	0.001 – 0.01[4]	
Solid Waste (phosphogypsum)	tonne/tonne P_2O_5	4 – 5[1]	
Anhydrite ($CaSO_4$)	tonne/tonne HF	3.7[4]	

Chlor Alkali Plants			
Cl_2 (partial liquefaction)	mg/Nm³	<1[3]	
Cl_2 (total liquefaction)	mg/Nm³	<3[3]	
Chlorates (brine circuit)	g/L	1 – 5[3]	
Bromates (brine circuit)	mg/L	2 – 10[3]	
Soda Ash Plants			
CO_2	kg/tonne soda ash	200 – 400[2]	
CL	kg/tonne soda ash	850 – 1100[2]	
Ca	kg/tonne soda ash	340 – 400[2]	
Na	kg/tonne soda ash	160 – 220[2]	
Waste water/suspended solids	m³/ /tonne/ tonne soda ash	8.5 – 10.7 / 0.09 – 0.24[2]	
Carbon Black Plants			
SO_2	kg/tonne of rubber grade carbon black	10 – 50[2]	
NO_X	mg/Nm³	<600[2]	
VOC	mg/Nm³	<50[2]	

Notes:
[1] European Fertilizer Manufacturers' Association (EFMA). 2000
[2] EU IPPC - Reference Document on Best Available Techniques in Large Volume Inorganic Chemicals - Solid and Other Industries. December 2006.
[3] EC IPPC - Reference Document on Best Available Techniques in the Chlor-Alkali Manufacturing industry. December 2001.
[4] EC IPPC - Reference Document on Best Available Techniques in Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilizers Industries. October 2006.

Source: WORLD BANK/IFC EHS Guidelines for LARGE VOLUME INORGANIC COMPOUNDS MANUFACTURING AND COAL TAR DISTILLATION, table 4, page 17f

- What measures are taken to avoid, treat and dispose of the waste (solid/liquid) generated and where/how is it deposited?
- Please give also details on possible waste incineration processes (type and quantity of waste, incineration temperature, etc.).

B.5. Noise

- How far is the nearest residential area away?
- Are noise mitigation measures necessary or planned? If so, what measures?
- Please state the noise impact (existing background noise level and additional noise emissions of the project) on the nearest receptors (industrial estates and residential areas) in dB(A) for day and night after completion of the project in accordance with the table below.

Noise Level Guidelines[1]				
	One Hour LA_{eq} (dBA)			
Receptor	**Guideline Value Daytime (07:00-22:00)**	**Project Value Daytime (07:00-22:00)**	**Guideline Value Nighttime (22:00-07:00)**	**Project Value Nighttime (22:00-07:00)**
Residential; institutional; educational[2]	55		45	
Industrial; commercial	70		70	

Notes:
[1] Guidelines values are for noise levels measured out of doors. Source: Guidelines for Community Noise, WHO, 1999.
[2] For acceptable indoor noise levels for residential, institutional, and educational settings refer to WHO (1999).

Source: WORLD BANK/IFC GENERAL EHS GUIDELINES 2007, page 53

- Do the project's noise emissions lead to an increase of the background noise level at the nearest receptors by more than 3 dB(A)?

B.6. Occupational health and safety

- What safety measures and/or control systems are planned to prevent accidents?
- How are safety and health (in particular with regard to process safety, oxygen-enriched and oxygen-deficient atmospheres, inhalation hazards due to dust, etc., gas releases, fire and explosions) guaranteed at the workplace?
- What average and maximum noise exposure is to be expected at the workplaces? What safety measures are taken at workplaces where the noise exposure exceeds 85 dB(A)?
- How are subcontractors integrated into the health and safety measures on site?
- Please make accident statistics for the past two years available to us.

B.7. Health and safety of the population

- What measures are taken to minimize impacts and possible risks for adjacent communities in particular with regard to the storage and transport of hazardous materials, noise, odours, dust, and/or increased traffic?
- Please make information on infrastructure links (access roads, railway link, etc.), which may be necessary, available to us.

C Production of colours and pigments

C.1. Process and resources consumption

- Please give a technical description of the individual process steps.
- Does a production-related connection with other (planned) facilities exist (e.g. power generation)?
- How is the planned plant supplied with energy? What fuels are used?
- How is the planned plant supplied with raw materials?
- How are the finished goods transported away from the site?
- How is guaranteed that the environment is protected during transport, storage, handling and disposal of hazardous substances?

C.2. Air emissions

- Please state the maximum values of the parameters for any waste gases emitted in mg/Nm³ for all process steps, especially for VOCs, chlorine/chloride.
- Please also state the (expected) emission values (in particular greenhouse gas emissions (CO_2eq), dust (PM), sulfur dioxide (SO_2) and nitrogen oxides (NO_x) in mg/Nm³) for any steam and power generation. In the case of plants with a capacity of more than 50 $MW_{thermic}$ please use the questionnaire *Conventional Energy* as guideline.
- Please describe what measures are taken to avoid/reduce air emissions from the site.
- What limit values for ambient air quality are applicable in the buyer's country (please make a table available)? Please state the relevant expected emission levels. Please comment on any changes in the ambient air quality before and after the project implementation. If there are no national limit values, please use the table below.

WHO Ambient Air Quality Guidelines[1,2]					
	Averaging Period	**IFC Guideline Value [µg/m³]**	**Guideline Value Host country**	**Project Value (baseline status) [µg/m³]**	**Project Value (after imple-mentation) [µg/m³]**
Sulfur dioxide (SO_2)	24-hour	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)			
	10 minute	500 (guideline)			
Nitrogen dioxide (NO_2)	1-year	40 (guideline)			
	1-hour	200 (guideline)			
Particulate Matter (PM_{10})	1-year	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)			
	24-hour	150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)			
Particulate Matter ($PM_{2.5}$)	1-year	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline)			
	24-hour	75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)			
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)			
Notes: [1] World Health Organization (WHO). Air Quality Guidelines Global Update, 2005. PM 24-hour value is the 99th percentile. [2] Interim targets are provided in recognition of the need for a staged approach to achieving the recommended guidelines.					
Source: WORLD BANK/IFC GENERAL EHS GUIDELINES 2007, table 1.1.1, page 4					

- Please describe the on-site monitoring of air emissions as well as ambient air quality levels.

C.3. Fresh water and effluents

- How much (fresh) water is used on site? Is the water recirculated?
- Where and how is the water withdrawn?
- What wastewater streams are generated?
- How are effluents treated on site? Please state whether effluents are discharged into a public sewage treatment system or into surface water bodies (river, lake, sea). If there are discharges, please provide information on the quantities of the wastewater streams (e.g. m³/h or l/s).

- Please state the maximum values of the effluent parameters in mg/l, especially for TSS, AOX, BOD, COD, oil and grease, phenol, hexavalent chromium, copper, zinc, toxic organic substances (e.g. chlorinated hydrocarbons or benzidines), state each individual value.
- Please describe the measures planned to avoid/reduce/treat wastewater.
- Please describe the on-site monitoring of the effluent values.
- How and where are the effluents discharged? Please explicitly state the pH value and comment on a temperature rise at the point of discharge, describe possible effects of the discharge on the ecology of the water bodies and provide information on the condition and size of the water body (e.g. flow values, flow rate). Please give also details on protection measures.
- What national standards are applicable in the buyer's country for the discharge of sanitary sewage? How is sewage treated before it is discharged? Please state the expected values of the pollution levels in the sewage. If there are no national limit values, please use the table below.

Indicative Values for Treated Sanitary Sewage Discharges[1]			
Pollutants	**Units**	**Guideline Value**	**Project Value**
pH	pH	6-9	
BOD	mg/L	30	
COD	mg/L	125	
Total nitrogen	mg/L	10	
Total phosphorus	mg/L	2	
Oil and grease	mg/L	10	
TSS	mg/L	50	
Total coliform bacteria	MPN[2]/100 ml	400[1]	
Notes: [1] Not applicable to centralized, municipal, wastewater treatment systems which are included in EHS Guidelines for Water and Sanitation. [2] MPN = Most Probable Number			
Source: WORLD BANK/IFC GENERAL EHS GUIDELINES 2007, table 1.3.1., page 30			

C.4. Waste

- What relevant waste products are generated on site?
- What measures are taken to avoid, treat and dispose of the waste (solid/liquid) generated?
- Where/how is it deposited if necessary? Please state the residual content of any toxic organic substances in mg/kg.
- Please give also details on possible waste incineration processes (type and quantity of waste, incineration temperature, etc.).

C.5. Noise

- How far is the nearest residential area away?
- Are noise mitigation measures necessary or planned? If so, what measures?
- Please state the noise impact (existing background noise level and additional noise emissions of the project) on the nearest receptors (industrial estates and residential areas) in dB(A) for day and night after completion of the project in accordance with the table below.

Noise Level Guidelines[1]				
	One Hour LA_{eq} (dBA)			
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Notes: [1] Guidelines values are for noise levels measured out of doors. Source: Guidelines for Community Noise, WHO, 1999. [2] For acceptable indoor noise levels for residential, institutional, and educational settings refer to WHO (1999).				
Source: WORLD BANK/IFC GENERAL EHS GUIDELINES 2007, page 53				

- Do the project's noise emissions lead to an increase of the background noise level at the nearest receptors by more than 3 dB(A)?

C.6. Occupational health and safety

- What safety measures and/or control systems are planned to prevent accidents?
- How are safety and health guaranteed at the workplace?
- What average and maximum noise exposure is to be expected at the workplaces? What safety measures are taken at workplaces where the noise exposure exceeds 85 dB(A)?
- How are subcontractors integrated into the health and safety measures on site?
- If the project consists in the modernisation or extension of an existing plant, please make accident statistics for the past two years available to us.

C.7. Health and safety oft he population

- What measures are taken to minimize impacts and possible risks for adjacent communities in particular with regard to the handling of hazardous materials, avoidance of leakages, waste disposal, traffic management, emergency plans, cooperation with local rescue teams?

D. Additional information

Additional information on the **Common Approaches**, our **environmental, social and human rights due diligence** and the **applicable standards** can be found at:

https://agaportal.de/en/main-navigation/schnellzugriff-aga-konsortium/verantwortung

The **World Bank/IFC EHS Guidelines** can be found on the website:

http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+management/ehsguidelines.