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Shurtan GAS CHEMICAL COMPLEX

ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) – VOLUME I

Project Document No

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SGCCUP – ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT

REV	DESCRIPTION	ORIG	REVIEW	WORLEY-PARSONS APPROVAL	DATE	CLIENT APPROVAL	DATE
A	Issued for Review	K Kamyshina / S Mcclymont	T Romanenko	T Goodhand	29 Sep-17	N/A	
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CHANGES SINCE THE PREVIOUS VERSION INCLUDE:

SECTION	DESCRIPTION

HOLDS:

NO.	SECTION	DESCRIPTION
VOLUME I		
1	2.5.3	Construction Accommodation Camp: Confirmation concerning the requirements of the construction accommodation camp e.g. construction programme is awaited
2	2.5.5	Temporary Construction Facilities Land Area: The actual layout and land location for the temporary construction facilities requires confirmation
VOLUME II		
3	7.5.3.3	Local Surface Watercourses: Description of Project site drainage system and volumes is required from Project Team
4	8.6	Eco-system Service: Awaiting inputs from socio-economic assessment
5	8.6.2	Agriculture: Awaiting inputs from Social Baseline Assessment
6	8.6.3	Livestock: Awaiting inputs from Social Baseline Assessment
7	8.6.4	Capture Fisheries: Awaiting inputs from Social Baseline Assessment
8	8.6.5	Edible Plants: Awaiting inputs from Social Baseline Assessment
9	8.6.6	Hunting: Awaiting inputs from Social Baseline Assessment
10	8.6.8	Biochemicals, natural medicines and pharmaceuticals: Awaiting inputs from Social Baseline Assessment

11	9.11.2	Intangible Cultural Heritage and Traditional Beliefs - Awaiting Project Specific Information from in-country studies

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Appendices

ABBREVIATIONS / DEFINITIONS

Acronym	Description
AGRU	Acid Gas Removal Unit
AMSL	Meters above mean sea level
AOI	Area of Influence
ASU	Air Separation Unit
BAT	Best Available Technique
BoD	Basis of Design
B1	Butene-1
Bq.kg-1	Bequerel per kg (rate of radioactive decay)
°C	Celsius
Ca^{2+}	Calcium
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
Cl^-	Chlorine ion
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide equivalent
CR	Critically Endangered
dBA	Decibels
DD	Data Deficient
DEA	Diethyl Amine
DEIS	Draft Environmental Impact Statement
DIB	Deisobutenizer
DMDS	Dimethyl Disulphide
DOX	Direct Oxidation
EDR	Equivalent Dose Rate

Acronym	Description
EEVARn	Equivalent Equilibrium Volumetric Activity of Radon Progenies
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EN	Endangered
ESIA	Environmental and Social Impact Assessment
ESHSIA	Environmental, Social, Health and Safety Impact Assessment
ESMMP	Environmental and Social Management & Monitoring Plan
EU	Ethylene Unit
FEED	Front End Engineering Design
FEED1	Front End Engineering Design Phase 1
FEED2	Front End Engineering Design Phase 1
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GIIP	Good International Industry Practice
GSU	Gas Separation Unit
GTL	Gas to Liquids
ha	Hectare
HCO^{3-}	Bicarbonate ion
H_2S	Hydrogen Sulphide
H_2O	Hydrogen Oxide
HDPE	High Density Polyethylene
HIV	Human Immunodeficiency Virus
H1	Hexene-1
HP	High Pressure
HSE	Health, Safety & Environment

Acronym	Description
IBA	Important Bird Area
IFC	International Finance Corporation
IFC-PS	International Finance Corporation Performance Standards
IUCN	International Union for Conservation of Nature
kg/h	Kilograms per hour
km	Kilometre
Km^2	Square kilometre
KMC	Karshi Main Canal
ktpa	Kilo tonnes per annum
LC	Least Concern
LDPE	Low Density Polyethylene
LLDPE	Linear Low Density Polyethylene
LP	Low Pressure
L/s	Litres per second
m	Metre
m^3	Cubic metre
MAC	Maximum allowable concentrations
MAWR	Ministry of Agriculture and Water Resources
mbgl	metres below ground level
Mg^{2+}	Magnesium ion
mg/m^3	Milligrams per cubic metre
MHRUz	Ministry of Health
MLSW	Ministry of Labour and Social Welfare of the Republic of Uzbekistan
m/s	Metres per second
m^3/s	Cubic metre per second

Acronym	Description
mm	Millimetre
mm^3	Cubic millimetre
mm^3/yr	Cubic millimetre per year
mm/day	Millimetres per day
mm/year	Millimetres per year
MP	Medium pressure
MPC	Maximum permissible concentrations
MVD	Ministry of Internal Affairs
NCU	Naphtha Cracker Unit
NGO	Non Governmental Organisation
NOx	Nitrogen Dioxides
NT	Near Threatened
O_2	Oxygen
OECD	Organization for Economic Cooperation and Development
OSBL	Outside Battery Limits
PM10	Particulate Matter
PPM	Parts Per Million
PSA	Pressure Swing Adsorption
RUz	Republic of Uzbekistan
SCEEP	State Committee of the Republic Uzbekistan on Ecology and Environmental Protection
SEC	Statement of Environmental Consequences
SEE	State Environmental Expertise
SEP	Stakeholder Engagement Plan
SGCC	Shurtan Gas Chemical Complex
SGCCUP	Shurtan Gas Chemical Complex Upgrade Project

Acronym	Description
SO_2	Sulphur Dioxides
SO_4^-	Sulphate ion
SHP	Super High Pressure
SHU	Selective Hydrogenation Unit
SRU	Sulphur Reovery Unit
TDS	Total Dissolved Solids
TiO2	Titanium Oxide Catalyst
THU	Total Hydrogenation Unit
TLE	Transfer Line Exchangers
ToR	Terms of Reference
µg/m^3	Micrograms per cubic metre
UN	United Nations
µSv.h-1	Micro-sievert per hour (radiation dose rate)
UNG	Uzbekneftegaz
VAR	Indoor Radon Concentration
VU	Vulnerable
VU:D	Vulnerable: Declining
VU:R	Vulnerable: Naturally Rare
WP	WorleyParsons
WRB	World Reference Base for Soil Resources

NON-TECHNICAL SUMMARY

Overview

The Shurtan Gas Chemical Complex (SGCC) in the Kashkdarya region, Uzbekistan, operated by Uzbekneftegaz (UNG) (National Oil and Gas Company of Uzbekistan), is an existing facility, operational since 2001. The SGCC is to undergo facility and plant upgrade works, to increase the overall production output of polyethylene and introduce additional production of polypropylene. Commencement of operation of the upgraded facilities is scheduled for December 2024.

The Environmental and Social Impact Assessment (ESIA) has been prepared in accordance with Good International Industry Practice (GIIP), namely the International Finance Corporation Performance Standards (IFC, 2012), the World Bank EHS Guidelines (2007) and the Organization for Economic Cooperation and Development (OECD) Common Approaches (2016).

Site Location & Context

The SGCC site is located in south-west of the Republic of Uzbekistan,. The site is approximately 430km from Tashkent and 33km south west of the City of Karshi, and is within the Guzar District in the Kashkadarya Region. The area in which the SGCC site is situated is largely undeveloped, with the closest settlements being the villages of Otkuduk and Navbahor, 6km and 10km away. In addition two work camps are also present within 3km of the site. Much of the immediately surrounding land is uncultivated; however there was an of formal farmland within the Navbahor Village, which was established for the provision of products for the SGCC workers, but later was transferred to government authority. The Shurtan Specialised Forestry is also located approximately 2km north-west of the SGCC plant. Existing services and infrastructure available in the region of the SGCC site include a serviced railway and the national power grid. Water is supplied directly from the KMC (Karshi Main Canal) through the pump station and there is a back-up water supply for the SGCC provided by the SGCC Reservoir located 4km away.

Project Description

The current plant operated by SGCC utilises natural gas from the Shurtan Gas field, to separate ethane and produce ethylene. The ethylene is converted into Linear Low Density Polyethylene (LLDPE), as the primary product. The Project aims to increase the Polymer Grade Ethylene production capacity from the current level of 140 ktpa to a level of 430 ktpa and add Polymer Grade Propylene production of 98 ktpa. With this additional ethylene and propylene SGCC intends to install a new bimodal polyethylene unit and a polypropylene unit to produce additional 280 ktpa of HDPE product and 100 ktpa of polypropylene product. This is achieved by using a feed of 430 kta of Naptha from the nearby GTL plant and by increasing the ethane content in the natural gas feed to approximately 60%.The Ethylene/Propylene plant will additionally produce Hydrogenated Py-Gas as by-product.

Without completion of the SGCCUP, the current operation and output of polyethylene would continue at its current level, without change or modernization of the equipment, design technology or polyethylene production output.

For the supply of raw gas with highest ethane content, a new gas pipeline from Shurtan Gas Processing Plant (SGPP) will be constructed. In addition, natural gas booster compression station in

SGPP will be modified in order to ensure the reliability of gas supply for newly constructed GTL Plant and SGCCUP as well.

The new landfill will be established/constructed nearby to handle the industrial wastes from both GTL and SGCCUP plants.

Other Infrastructure – Waste Management & Water Supply

Approximately 36 waste streams are generated from the SGCC as a result of the existing plant and utilities operations, including solid, liquid, sludge, domestic and food waste; and divided into hazardous and non-hazardous consitutents. Long term storage of wastes is undertaken in an engineered landfill located 3 km from SGCC location.

The SGCC sources water from the Karshi Main Canal (KMC) through the pump stations. Water is diverted from the Amu Darya River to the Talimardzhan reservoir by the Karshi pump stations. The Talimardzhan Reservoir feeds the KMC which supplies water to irrigators and towns. The primary water supply is abstracted from the KMC via a pumping station and 25km pipeline (1020mm diameter) for distribution to the facility. A second water abstraction from the KMC is distributed to the artificial SGCC reservoir. This reservoir used as alternate water supply and a back-up water supply for the winter season as well.

Currently permitted waste water is discharged at two outlets into the export drainage YK canal (South canal). One outlet discharges clean effluent that requires no pre-treatment (260 m3/hr or 72 L/s). The second outlet discharges treated industrial and domestic effluent (109 m3/hr or 30 L/s). Treatment includes physical, chemical, mechanical, and biological processes.

Atmospheric Emissions

Gas fired combustion equipment including the cracking heater, steam boiler and flares are the key point sources of the atmospheric emissions from the site. Combustion of large quantities of fuel gas in the cracking heater during normal and decoking operations and within the boiler will result in emissions of nitrogen dioxides (NOx), particulate matter (PM10), carbon dioxide (CO2) and water vapor. Sulphur dioxide (SO2) emissions from the combustion sources depend on the levels of hydrogen sulphide (H2S), estimated to be 20 mg/m3 maximum. Flue gas emissions (comprising the above-mentioned gases and water vapor) from the cracking heaters may exceed 143,000kg/h and 160,000 kg/h during normal and peak operations respectively.

Addition of a new flare for the SGCC upgrade Project will increase the intermittent flue gas emissions. However, the increase in flaring emissions will not be proportional to the increase in plant capacity.

Construction Strategy

The proposed construction strategy for SGCCUP is to maximize on-site pre-assembly at an area local to the site, over a 30-36 month completion and commissioning programme. An existing construction accommodation camp will be utilised (for which the details are awaiting confirmation) comprising:

- 5000 to 46000 construction personnel;
- Land area to cover approximately 43 Hectares;
- Includes service facilities (such as canteen, shops, laundry, sport area, medical aid, etc.) areas and vehicle / bus parking.

Legislative Framework

The SGCCUP and ESIA will conform to the following requirements:

- Uzbekistan regulatory environmental standards and management directives
- International Finance Corporation (IFC) (World Bank Group) Social & Environmental Performance Standards and the IFC EHS General Guidelines;
- Equator Principles;
- Good International Industry Practice (GIIP) following the approach of the Organization for Economic Cooperation and Development (OECD) Common Approaches (2016), and
- Corporate requirements from SGCC and their partner companies.

Baseline Environments

Climate & Emissions

Uzbekistan's climate is classified as continental with hot summers and cool winter. The Project site is located in a cold semi-arid climate area.

Greenhhouse Gas (GHG) emissions in the country have been increased by 13.7% between 1990 and 2012. The total direct GHG emissions in the 2012 have been estimated to be 205.2 million tonnes CO2 equivalent (CO2e). 82.4% of the GHG emissions have been generated by the energy sector. Agriculture and waste contribute to 14% and 18% of total GHG emissions respectively. The most recent baseline air quality monitoring has been carried out as part of Oltin Yo'l GTL ESIA studies. The results indicate that the concentration of key air pollutants in the project area are very low and mostly contribute to a fraction of the ambient air quality standards.

Geology, Geomorphology & Soils

The SGCC site is located on the foothill plain of the southwest spurs of the Ghissar Mountain range. Middle Quaternary proluvial deposits are developed from the surface everywhere in the locality of the site and comprise loess/sandy loam and clayey sand. The ground investigation conducted on the SGCCUP site in 2017 indicates the shallow geology immediately beneath the site comprises of:

- Topsoil and loam/loess type deposits up to 10 m thick;
- Quaternary proluvial deposits comprising light brown clay and sand with gypsum noted throughout. The sequence becomes weakly cemented at depth with nodules / veins of gypsum.

The natural soil layer was removed or reworked during construction of the SGCC project. As a low rainfall semi-arid region, the soils in the broader area require irrigation for successful crop production.

The irrigation schemes have been proven to damage the soil through salinization and modification of the soil structure lowering permeability and affecting plant growth.

Uzbekistan is located in the middle of Central Asia within a zone of high seismic activity. The Project site is in a seismically active area of moderate to high risk, with a seismicity of 7 points according the Uzbekistan seismic code KMK 2.01.03-96 “Norms and Regulations for Construction in Seismic Zones”. Design seismicity of the Project site is to 8 on the Richter scale.

Hydrology, Hydrogeology & Water Resources

The Talimardzhan reservoir is the largest surface feature fed by the Karshi Main Canal , with a capacity of 1.5 Bm3. The KMC serves an extensive network of feeder canals and irrigation ditches that cover the Karshi Plain. The water supplies irrigators and domestic users as well as the SGCC. The SGCC Reservoir, located approximately 4km to the northeast of the project, is a contingent water storage reservoir for the SGCC, and has a capacity of 11.5 Mm3. The reservoir is directly fed from the KMC through the Pump station B. As well as being a back-up water supply for the SGCC, the reservoir is also used for irrigation of the forest plantation (“Green Zone”) around SGCC. The SGCC Reservoir has a designated water protection zone of 20 m from the water’s edge.

Groundwater within the proximity of the project cannot be considered as a source for water supply due to the low permeability of the strata and generally poor water quality.

Noise & Vibration

The existing SGCC facilities are the main sources of anthropogenic noise in the project area. Initial calculations of the noise propagation from the plant location indicate that the construction site and about 1000m radius from the construction site can be exposed to high level construction noise. During the normal operations of the plant, the area of noise influence could be only a few hundred meters from the source because the noise level at a distance of 1m from the equipment should not exceed 80 d(B)A.

Biological Environment

Protected Areas

There are 23 protected areas in the territory of Uzbekistan: eight state reserves, one biosphere reserve, two National Parks, 12 state nature reserves and 6 IBAs. The closest to the project area are Gissar Mountain State Reserve and Surkhanskiy Mountain Woodland State Reserve.

Terrestrial Ecology

The project location area is characterised by semi-desert scrub lands. The vegetation cover is mostly sparse and consists of grasses and small shrubs with *Hordeum leporinum, Poa bulbosa, Vulpia persica and Poa s*p. being dominant species. The exception is the area surrounding water reservoir northeast of the site. The vegetation around the reservoir is represented by reeds and taller grasses. Vegetation in the project area display low diversity. Pioneer species have been identified in areas of ground disturbance, i.e. ditches, demolished buildings and generally dominate in the species composition.

Invertebrates

Arthropods constitute the largest group out of the invertebrates species in Uzbekistan with insects comprising the majority of species. Four protected species are recorded in the Kashkadarya Administrative Region; and 29 species were observed during the 2017 field survey, none of which were protected under IUCN. *Glaucopsyche charibdis,* listed in the Uzbekistan Red Book, status 2VU:D (Vulnerable:Declining) was registered during the 2017 survey.

Reptiles

In the desert areas of the Karshi steppe 26 species of reptiles have been recorded. Two listed species (*Testudo horsfieldii* – Central Asian tortoise and *Varanus griseus caspius* - Caspian Monitor) have been recorded on site during the survey undertaken by Golders from 27 April till 4 May 2010. *Testudo horsfieldi*i (Central Asian tortoise) and *Varanus griseus caspius* (Caspian Monitor) were recorded again during the survey in 2017, as well as *Naja oxiana* (Central Asian Cobra) and *Phrynocephalus helioscopus* (Sunwatcher).

Avifauna

Due to its size and its central position between Europe and Asia, Uzbekistan hosts a rich avifauna, with an estimated total of about than 500 species. Forty eight species (with 51 subspecies) of birds are included in the Uzbekistan Red data book, some of them breeding or wintering in the south-western part of the country. Several bird migration routes lie through Uzbekistan, Kazakhstan and Turkmenistan. Large numbers of birds (especially wildfowl, raptors and cranes) use favourable habitats for stop overs during migration. There are 47 Important Bird Areas identified in the territory of Uzbekistan. Talimardzhan reservoir and South West Guzor Foothills are located in the close proximity to the Project (16km and 24km respectively). In recent decades several water reservoirs were created in the Karshi Steppe. Those reservoirs provide good stop overs for migratory birds. 23 Listed species were observed in Karshi Steppe during the 2010 (under the Red Book or Uzbekistan or IUCN). A single individual of a Red Listed species (*Phalacrocorax pygmaeus*) was recorded during the survey in 2017 near the SGCC Reservoir. A Bird surveys carried out near the Talimardzhan reservoir have concluded that the breeding community of the Reservoir is poor. South West Gizzar Foothills is important for spring migration. The list of migrants is about 240-250 species, including high numbers of Demoiselle Crane (*Grus virgo*), in some years comprising more than 20,000 birds, which is about 10% of the entire global population.

Mammals

Species of fauna found in Uzbekistan include groups which in the historical past have migrated here from other regions, including Central Asian deserts and mountains, Indo-China, grasslands of Kazakhstan, Siberia, South Europe and North Africa. Currently there are 108 species of mammals in Uzbekistan. Out of 108 species 23 species could be observed in Karshi Steppe and particular the project area and surrounded territory. During the survey in the project area and adjacent territories only the following species listed were observed: *Spermophilus fulvus* (Yellow Ground Squirrel), *Lepus tolai* (Tolai Hare), *Vulpes corsac* (Corsac Fox) and *Hemiechinus auritus* (Long-eared Hedgehog). In addition to that a Kangaroo Rat was observed (*Dipodomys sp* - species not identified) and evidence of presence of large carnivore, probably stripped hyena (*Hyaena hyaena*).

Aquatic Ecology

Uzbekistan is a country of predominately arid desert climate. Most of the countries' water is coming from rainfall and snowmelt from the mountains. The reservoirs normally start being filled in March-

April time and reach the highest level in 40-80 days. The reservoirs are drained for irrigation during the summer and reach minimum water level by September (Kamilov & Urchinov, accessed on 9/12/2016). The hydrological pattern and water chemical composition are satisfactory for fish, even though water salinity gradually increases from foothills to lowlands. It was estimated that there are 819 (561 species – littoral, 132 – semi-submersed, 128 – submersed) species of aquatic and wetland plants in Central Asia, of which 39 belong to Chara genus, 62 – mosses, 17 – ferns and 701 are vascular flowering plants. Rotifers, cladocerans and copepods dominate amongst zooplankton species. Composition of benthos species is various depending on a water body and season (Kamilov & Urchinov, accessed on 9/12/2016). No Red Book species of either aquatic flora and fauna were observed in SGCC Reservoir.

Critical Habitats

The 2017 survey undertaken confirmed the presence of three main habitats in the area, none of which were defined as a Critical Habitat:

- Desert habitat;
- Steppe habitat;
- The SGCC Reservoir.

Social Environment

Regional & Local Demographics

The total population of Kashkadarya is 3.34 million people, the majority concentrated within the capital city of Karshi (The State Committee on Statistics, 2021). The district of Guzor has a population of 212,400 (The State Committee on Statistics, 2021). The population of Otkuduk, is located within 3 km of the project site has a population of 500 people (Golders, 2014). Eshonkuduk, approximately 20 km from the project site, includes the settlements of Kengsoy and Adbuhamit. The Mahallah (village council) of Eshonkuduk has a population of 4,032 people.

Of all territories/Oblasts in Uzbekistan, the region has the highest poverty rate and proportion of the population considered ‘disadvantaged’ (State Statistics Committee, Republic of Uzbekistan, 2007). Engagement with local leaders indicates that the most vulnerable groups are rural residents with lower educational levels, particularly women (Golders, 2014).

The rate of emigration from Kashkadarya has decreased over the past 24 years. In 2015 the number of both internal and external emigrants totalled 11,489 persons, compared to the 21,163 persons in 1991 (Indicators of Development, 2012-2015). Though no official statistics are available, discussions with stakeholders indicate that the current trends show young people leaving villages for larger towns and cities (Golder Interview, 2010 and 2013). Rates of immigration from Kashkadarya also decreased between 1991-2015, from 20,639 persons entering the region in 1991, to 11,598 persons entering in 2015 (Indicators of Development, 2012-2015). These tendencies (increasing) for both emigration and immigration are still kept as is to the date.

Regional Economic Profile

Kashkadarya as is a region is widely known for its natural resources with the largest fields of hydrocarbons in the country with the largest gas processing enterprises in Uzbekistan, the Shurtan

Gas Chemical Complex (SGCC), Shurtan Gas Processing Plant and the Mubarek Gas Processing Plant (Golders, 2014). The region also has substantial agricultural resources (Golders, 2014).

Regional Livelihoods

The livelihoods of the people of the settlements closest to the Proposed Development, Otkuduk in the Nishon district, and Enshonkuduk and Abduhamit in the Guzor district are very similar and largely based on livestock farming (Golders, 2014). Due to the climate, most farmers raise sheep and goats, which are less expensive to feed. Most animals are taken to markets in Guzor or Karshi. Many families also raise chickens and turkeys for personal consumption (Golder Interview, 2010).

Regional Landuse

At a local level, land is owned by the Government and is rented for periods of 30 to 50 years. The land used by the SGCC project is property of the Government with no private leases within the Project footprint (Golders, 2014).

The Shurtan Specialised Forestry is located approximately 2km north-west of the SGCC plant which the planting of Amaranthaceae. Haloxylon (saxaul) around the SGCC site covering an area of approximately 200ha. A significant proportion of the land within a 10 km radius of the project site is arid desert.

Impact Assessment Methodology

Impacts are defined as physical changes to the physical, biological and / or socio-economic environment attributable to the construction and operation of the SGCCUP, which will occur at different scales and extents over time and space. The significance of the impacts has been defined through consideration of the impact magnitude, receptor sensitivity and the probability of the impact occurring. This has been done both pre-mitigation and post-mitigation, taking account of measures incorporated into the project design to reduce or remove impacts. Where the impact assessment has defined high or moderate significance impacts, further consideration is given to additional mitigation measures, in conjunction with the design elements, to adequately compensate for the impacts. The resultant impact significance is determined by ranking impact magnitude against the receptor sensitivity (Table A).

Table A– Impact Significance

		RECEPTOR SENSITIVITY			
IMPACT MAGNITUDE (inc Likelihood)		**NEGLIGIBLE**	**LOW**	**MODERATE**	**HIGH**
	NEGLIBIBLE	Not significant	Not Significant	Not Significant	Low / Not significant*
	LOW	Not significant	Low	Moderate / Low	Moderate
	MODERATE	Not significant	Moderate / Low	Moderate	High
	HIGH	Low	Moderate	High	High

The ESIA identifies opportunities to reduce adverse impacts recorded as ‘Moderate’ or ‘High’ through proposing of practical and cost-effective mitigation measures. Mitigation measures will include commitments to long-term operation and maintenance as well as monitoring required ensuring their effectiveness.

Preliminary Environmental and Social Management and Monitoring Plan

All the mitigation, management measures and commitments identified during the impact assessment for the construction, operation and decommissioning phases have been incorporated into the Preliminary Environmental and Social Management and Monitoring Plan. Tables B, C and D summarise the impacts reduced to 'Moderate' or above only. All other impacts have been reduced to 'Low' or 'Not significant'. The tables define the measures necessary to avoid, reduce, and remedy identified significant negative impacts to acceptable levels and promote and enhance positive impacts. These will satisfy both SGCC's internal policies, local HSE standards/guidelines and where these are not available, international standards/guidelines will be used. Any additional requirements defined by other permitting, SGCC and the lenders are also included in the ESMMP.

Table B: Construction Impacts and Mitigation Measures

PROJECT ACTIVITY / ASPECT	POTENTIAL IMPACT	RECEPTOR	IMPACT SIGNIFICANCE PRE-MITIGATION	IMPACT SIGNIFICANCE POST-MITIGATION	MITIGATION MEASURE	MONITORING / MEASUREMENT	RESPONSIBLE	PERFORMANCE INDICATOR
Construction : Domestic waste	Impact on soil and water quality, visual impact, social impact, impact on fauna	Soil, water, landscape, communities, fauna	**HIGH**	**MODERATE**	- Project integrated waste management system. - All non-hazardous waste to be managed under Uzbekistan and SGCC waste management practices.	Waste mishandling incidents reported / Internal inspections	Contractor	0 mishandling of waste incidents reported / Inspections showing Project Waste Management procedures are being followed
Construction : Influx of construction workers	Women security	Communities and workforce	**HIGH**	**MODERATE**	The mitigation measures for this impact will be implemented as part of the Social Management Plan. Provide workers with an induction kit / training specifying community and company expectations of the workers behaviour. Code of Conduct will include zero tolerance and disciplinary procedures for inappropriate behaviour. Maintain grievance mechanism for communities to register issues / comments.	Incident reporting	Contractor / SGCC	Percent of construction workers who completed induction training – Target 100% / All personnel sign Code of Conduct / 0 incidents of inappropriate behaviour is recorded
Construction : Influx of construction workers	Alcohol and drugs	Communities and workforce	**HIGH**	**MODERATE**	The mitigation measures for this impact will be implemented as part of the Social Management Plan. Code of Conduct includes zero tolerance for drug and alcohol use. This information will be included in the Induction training. Random drug and alcohol tests will be conducted on the personnel. Promote alcohol free recreational activities outside working hours.	Incident reporting	Contractor	Percent of construction workers who completed induction training – Target 100% / All personnel sign Code of Conduct / 0 incidents of inappropriate behaviour is recorded / 0 positive drug

PROJECT ACTIVITY / ASPECT	POTENTIAL IMPACT	RECEPTOR	IMPACT SIGNIFICANCE PRE-MITIGATION	IMPACT SIGNIFICANCE POST-MITIGATION	MITIGATION MEASURE	MONITORING / MEASUREMENT	RESPONSIBLE	PERFORMANCE INDICATOR
								and/or alcohol use results
Construction : Influx of construction workers	Increase of STD rates and the capacity of local medical facilities to cope	Communities and workforce	**HIGH**	**MODERATE**	The mitigation measures for this impact will be implemented as part of the Social Management Plan and Health and Safety Plan. Provision of an onsite medical service for the additional workforce. Liaison with regional health / emergency services providers as part of Emergency Response Plan	Incident reporting	Contractor / SGCC	Emergency Response Procedures developed and reviewed annually / Agreements with Regional medical facilities in place
Construction : Influx of construction workers	Road traffic accidents	Communities and workforce	**HIGH**	**MODERATE**	The mitigation measures for this impact will be implemented as part of the Construction Management Plan and the Health and Safety Management Plan. Traffic Management Plan will provide measures to reduce risk of accidents and Road safety awareness initiatives for personnel and residents.	Incidents reporting	Contractor	0 road traffic accidents
Construction : Influx of construction workers	Inflation, increased prices for basic household items	Communities and workforce	**HIGH**	**MODERATE**	The impacts of inflation will aim to be localised within the workers camp as to not impact upon local communities, through provision of a shop (s) within the work camp for workers to purchase their goods. A formal monitoring system will be devised in order to assess inflatory impacts, through regular consultation with the Community Liaison Officer (CLO). Feedback from the CLO includes comments on an increase in prices, a more formal monitoring system will be devised in order to monitor the prices of staple goods and services in local markets on a monthly basis. This will be carried out both within the Local and Regional	Increased prices reporting	Contractor / SGCC	No increase in prices of staple goods and services in local markets

PROJECT ACTIVITY / ASPECT	POTENTIAL IMPACT	RECEPTOR	IMPACT SIGNIFICANCE PRE-MITIGATION	IMPACT SIGNIFICANCE POST-MITIGATION	MITIGATION MEASURE	MONITORING / MEASUREMENT	RESPONSIBLE	PERFORMANCE INDICATOR
					Study Areas, in order to determine whether inflation is a localised impact.			

Table C: Operational Impacts and Mitigation Measures

PROJECT ACTIVITY / ASPECT	POTENTIAL IMPACT	RECEPTOR	IMPACT SIGNIFICANCE PRE-MITIGATION	IMPACT SIGNIFICANCE POST - MITIGATION	MITIGATION MEASURE	MONITORING / MEASUREMENT	RESPONSIBLE	PERFORMANCE INDICATOR
Operation : GHG emissions	Climate change	Atmosphere	**MODERATE**	**MODERATE**	Design in accordance with applicable standards and codes	Air Quality Monitoring	SGCC	Maximum and average concentrations of PM, Nox, Sox, CO emissions are below guidelines
Operation : Reservoir evaporation (cumulative)	Salinisation of reservoir	Aquatic ecology of reservoir	**HIGH**	**MODERATE**	- Recycling of wastewater for process uses to minimise water consumption and abstraction from the KMC; - Value Engineering to assess water efficient equipment / fixings are employed; - Irrigation to use drip fed method to conserve water and reduce abstractions; - Water efficient measures within domestic areas	Surface Water Monitoring Aquatic Ecology Monitoring	SGCC SGCC	No change in salinity No change in composition of main species
Operation : Reservoir evaporation (cumulative)	Salinisation of reservoir	Terrestrial ecology	**HIGH**	**MODERATE**	- Recycling of wastewater for process uses to minimise water consumption and abstraction from the KMC; - Value Engineering to assess water efficient equipment / fixings are employed;	Surface Water Monitoring Terrestrial Ecology Monitoring	SGCC SGCC	No change in salinity No change in numbers of main species observed

					- Irrigation to use drip fed method to conserve water and reduce abstractions; - Water efficient measures within domestic areas;			on/to the close proximity to the reservoir
PROJECT ACTIVITY / ASPECT	POTENTIAL IMPACT	RECEPTOR	IMPACT SIGNIFICANCE PRE-MITIGATION	IMPACT SIGNIFICANCE POST-MITIGATION	MITIGATION MEASURE	MONITORING / MEASUREMENT	RESPONSIBLE	PERFORMANCE INDICATOR
Decommissioning : Reservoir closure	No water in reservoir	Aquatic ecology of reservoir	**HIGH**	**MODERATE**	Decommissioning management plan to assess ecological potential	Surface Water Monitoring	SGCC	No change in salinity
						Aquatic Ecology Monitoring	SGCC	No change in composition of main species
						Abstraction Metering	SGCC	Water efficiency target to reduce consumption 10% year-on-year & Top 10% on industry benchmark
Decommissioning : Reservoir closure	No water in reservoir	Terrestrial ecology	**HIGH**	**MODERATE**	Decommissioning management plan to assess ecological potential	Surface Water Monitoring	SGCC	No change in salinity
						Terrestrial Ecology Monitoring	SGCC	No change in numbers of main species observed on/to the close proximity to the reservoir
								Water efficiency target to reduce

Table D: Decommissioning Impacts and Mitigation Measures

PROJECT ACTIVITY / ASPECT	POTENTIAL IMPACT	RECEPTOR	IMPACT SIGNIFICANCE PRE-MITIGATION	IMPACT SIGNIFICANCE POST-MITIGATION	MITIGATION MEASURE	MONITORING / MEASUREMENT	RESPONSIBLE	PERFORMANCE INDICATOR
						Abstraction Metering	SGCC	consumption 10% year-on-year & Top 10% on industry benchmark

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1. INTRODUCTION

1.1 Introduction to the Shurtan Gas Chemical Complex Upgrade Project

The Shurtan Gas Chemical Complex (SGCC) in the Kashkadarinskaya Province, Uzbekistan (Figure 1), operated by Uzbekneftegaz (UNG), is an existing facility, operational since 2001. The SGCC is to undergo facility and plant upgrade works, to increase the overall production output of polyethylene and introduce additional production of polypropylene. Commencement of operation of the upgraded facilities is scheduled for December 2025.

This document comprises the Environmental and Social Impact Assessment (ESIA) Report for the SGCC Upgrade Project (SGCCUP). The ESIA has been prepared in accordance with Good International Industry Practice (GIIP), namely the International Finance Corporation Performance Standards (IFC, 2012), the World Bank EHS Guidelines (2007) and the Organization for Economic Cooperation and Development (OECD) Common Approaches (2016).

A separate Environmental Impact Assessment (EIA) is in preparation (by others) to meet both the Republic of Uzbekistan's (RUz) regulatory framework and the requirements of the State Committee of the Republic Uzbekistan on Ecology and Environmental Protection (SCEEP), in addition to this GIIP ESIA.

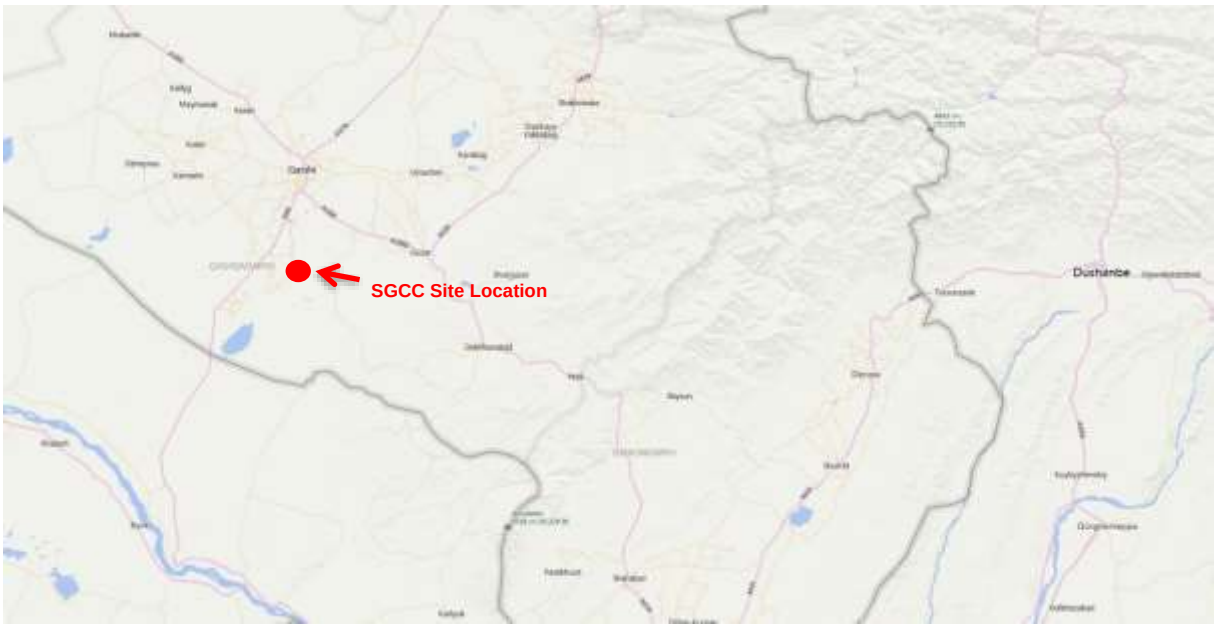
This chapter provides an overview of the SGCCUP, the scope and objectives of this ESIA Report, the anticipated schedule for the SGCCUP development, and the overall structure and content of this ESIA.

1.2 Project Overview

1.2.1 Location

The SGCC project site is located in the south-west of the Republic of Uzbekistan, close to the border with Turkmenistan. The site is approximately 430km from Tashkent and 33km south west of the City of Karshi (Figure 1 and Figure 2). The Project site is located in the territory of the Guzar District in the Kashkadarya Region. In accordance with the Basis of Design, the site location co-ordinates are approximately 38.2735° N, 65.4812° E (Ref. WP, 2017). The site is located at an elevation approximately +425m above sea level.

1 SGCC Site Location. (Source: www.bing.com/maps)



2 SGCC Regional Site Location. (Source: www.bing.com/maps)

1.2.2 Site History

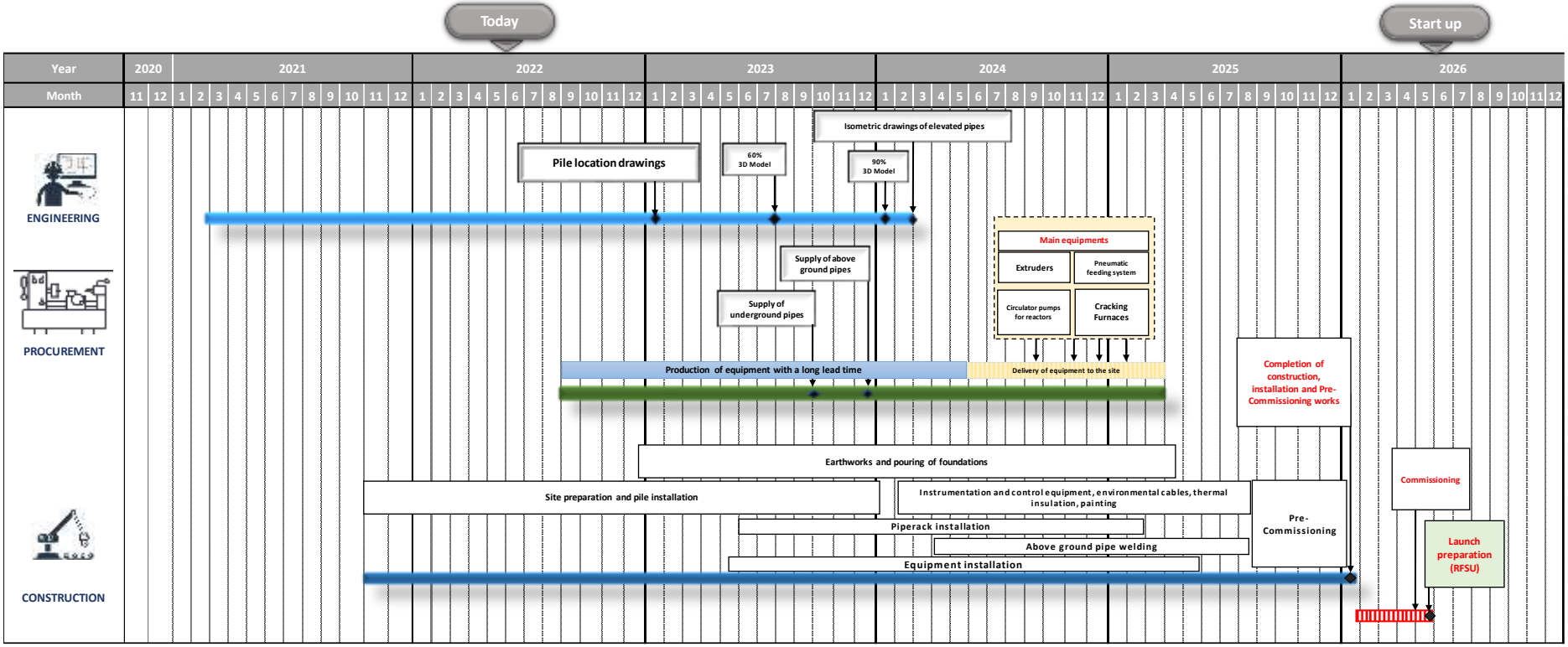
Construction for the SGCC site started in 1998. Operations at the SGCC site commenced in 2001, with the plant, with the facilities now being 16 years old. No previous significant upgrade works or other project development is known to have taken place to date.

1.2.3 Project Area

The area in which the SGCC site is situated is largely undeveloped. The closest settlements to the site are the villages of Otkuduk and Navbahor, 6km and 10km away. In addition two work camps are also present within 3km of the site. Much of the immediately surrounding land is uncultivated; however there are areas of formal farmland within the Navbahor Village, associated with the provision of products for the SGCC workers. The Shurtan Specialised Forestry is also located approximately 2km north-west of the SGCC plant. Existing services and infrastructure available in the region of the SGCC site include a serviced railway and the national power grid. Water is supplied directly from the KMC (Karshi Main Canal) and there is a back-up water supply provided by the SGCC Reservoir located less than 4km away from the site.

1.2.4 Development Schedule

The SGCCUP is currently in the Detailed Design phase (DD), and commencement of the operation of the upgraded and new facilities is scheduled for December 2025. The development schedule for the SGCCUP is shown in Figure 3 below.



3 High Level SGCCUP Schedule

1.3 Project Proponent

1.3.1 Uzbekneftegaz

SGCC is operated by UNG. UNG is the National Oil and Gas Company of Uzbekistan. Its production is predominantly aimed at the domestic and agricultural markets (Ref. http://www.uzneftegaz.uz/en/about).

1.3.2 SGCC

SGCC is a limited liability company, which is part of the Joint-Stock Company “Uzbekneftegas”.

1.4 Need for Development

The current plant operated by SGCC utilises natural gas from the Shurtan Gas field, to separate ethane and produce 140 ktpa of ethylene which is then converted to produce up to 125 ktpa of Low Density Polyethylene (LLDPE) as their primary product. Future assessment of natural gas has identified an increase in ethane composition by up to 60% that can be processed to produce an additional 80 ktpa of ethylene. 430 ktpa Naphtha is available from the GTL plant. SGCC will install a Naphtha Cracker to process the Naphtha and excess ethane from the Gas Separation unit to produce 285 ktpa ethylene and 100 ktpa propylene. With this additional ethylene and propylene SGCC intends to install a new bimodal polyethylene unit and a polypropylene unit to produce additional 280 ktpa of HDPE product and 100 ktpa of polypropylene product. The Ethylene / Propylene unit will additionally produce Hydrogenated Py-Gas as by-product.

Without completion of the SGCCUP, the current operation and output of polyethylene would continue at its current level, without change or modernization of the equipment, design technology or polyethylene production output.

1.5 ESIA Requirements for the Project

1.5.1 International Finance

The SGCC upgrade project is subject to international finance (noting that at the time of writing specific financial institutions providing funding are awaiting confirmation). As such this ESIA Report has been prepared in alignment with the following listed GIIP; environmental and social standards and guidelines:

- The Equator Principles (2013);
- The Organization for Economic Cooperation and Development (OECD) Common Approaches (2016);
- The World Bank EHS Guidelines, including the General HSE guidelines (2007) and applicable Industry Sector Guidelines; and
- The International Finance Corporation Performance Standards (IFC-PS) 1 to 8 (IFC 2012).

This ESIA Report has been prepared by WorleyParsons (WP) Europe Limited, in accordance with the GIIP, standards and guidelines documented above.

1.5.2 Objectives & Development of the ESIA

In accordance with the Equator Principles, the OECD Common Approaches and IFC-PS 1 - Assessment and Management of Environmental and Social Risks and Impacts (IFC, 2012) the objectives of this ESIA are defined as follows:

- "To identify and evaluate environmental and social risks and impacts of the project;
- To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate / offset for risks and impacts to workers, affected communities, and the environment;
- To promote improved environmental and social performance of clients through the effective use of management systems;
- To ensure that grievances from affected communities and external communications from other stakeholders are responded to and managed appropriately; and
- To promote and provide means for adequate engagement with affected communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated (IFC,2012)."

1.5.3 Structure of the ESIA

Table 1 below provides the structure of this ESIA Report for the SGCCUP.

Table 1 – Structure of ESIA Report

Chapter		Contents Description
0	Non-technical Summary	Summary of the ESIA final report and key issues identified.
1	Introduction	The introduction provides an overview of the context of the site, location and objectives of the ESIA.
2	Description of the proposed development	This chapter provides a description of the nature of the upgrade activity and includes projected requirements for input of materials and services, output of waste materials, emissions and discharges during the construction, operation and decommissioning lifecycle stages.
3	Consideration of alternatives	This section confirms the alternative methods / equipment and technologies, design of facilities, and will also consider the 'without project' option. Specific environmental and social issues associated with the project alternatives are outlined.
4	Legal and regulatory framework	The legal and regulatory framework provides a description of relevant local and international

Chapter		Contents Description
		regulations, standards and guidelines governing environmental quality, health and safety that are applicable to the proposed project. It confirms regulatory bodies governing environmental quality, health and safety, protection of natural and cultural resources and land use control. A summary of SGCC's policies, principles and HSE corporate guidelines and the lenders ESIA requirements is also included.
5	ESIA approach and methodology	The approach and methodology section defines the criteria and definitions utilised to define magnitude and sensitivity in the environmental assessment. The section provides details on the ranking scheme used and application to the project.
6	Public consultation and disclosure	This section summarises all public consultation and disclosure activities completed as part of the ESIA process. It confirms how feedback and received comments have been incorporated into the overall ESIA process.
7-9	Description of the baseline (physical, biological & socioeconomic) environments	Baseline environmental conditions covering the physical, biological and socio-economic environments are documented to identify baseline conditions within the project area of influence.
10	Environmental & Social Impact Assessment	Identification of environmental and social aspects / impacts A summary of the key project aspects which have the potential to result in an impact on an identified environmental or social receptor are provided section. The potential impacts are classified according to whether they will / will not require further studies to define likelihood and consequence.
		Evaluation of significant environmental and social impacts / risks Assessment of the potential adverse environmental impacts requiring investigation during the ESIA process is provided in this chapter. Potential changes to environmental and socio-economic conditions resulting from the project activities are described and evaluated using a ranking process likely to consider: duration/frequency and scale of planned activities; probability (likelihood) and potential scale of unplanned events; sensitivity of (or consequences for) the receiving environments; and application of standard risk control/mitigation measures.
		Management of significant environmental and social impacts / risks

Chapter		Contents Description
		This section provides definition of all potential management options for each identified significant adverse impact, required to reduce the impact to an acceptable level. The management options consider measures to avoid, minimise, reduce or remedy the predicted negative impacts, or to compensate for those impacts that cannot be reduced.
		Cumulative Impacts A summary of cumulative impacts is provided where assessed to be applicable to the project.
		Residual Impacts A summary of the anticipated expected remaining impacts following implementation of management and mitigation measures is provided, together with the level of residual impact remaining. All residual impacts will be included within the preliminary Environmental and Social Management and Monitoring Plan ESMMP.
11	Preliminary Environmental and Social Management & Monitoring Plan (ESMMP)	Management measures and monitoring requirements are documented in the preliminary ESMMP. The preliminary ESMMP details measures to avoid, reduce and remedy identified significant negative impacts to an acceptable level and ensure positive impacts are promoted and enhanced. The preliminary ESMMP adheres to international standards/guidelines and SGCCs internal polices and local HSE standards/guidelines.
12	Summary & Conclusions	A summary of the key findings and recommendations of the ESIA is provided.

1.6 Related Documentation

A separate Environmental Impact Assessment (EIA) is in preparation (by others) to meet both the Republic of Uzbekistan's (RUz) regulatory framework and the requirements of the State Committee of the Republic Uzbekistan on Ecology and Environmental Protection (SCEEP).

This ESIA has been prepared separately to this national EIA, by different parties. As such there may be some differences between the documents due to the variation between the RUz's regulatory framework and SCEEP requirements, and those of an international ESIA.

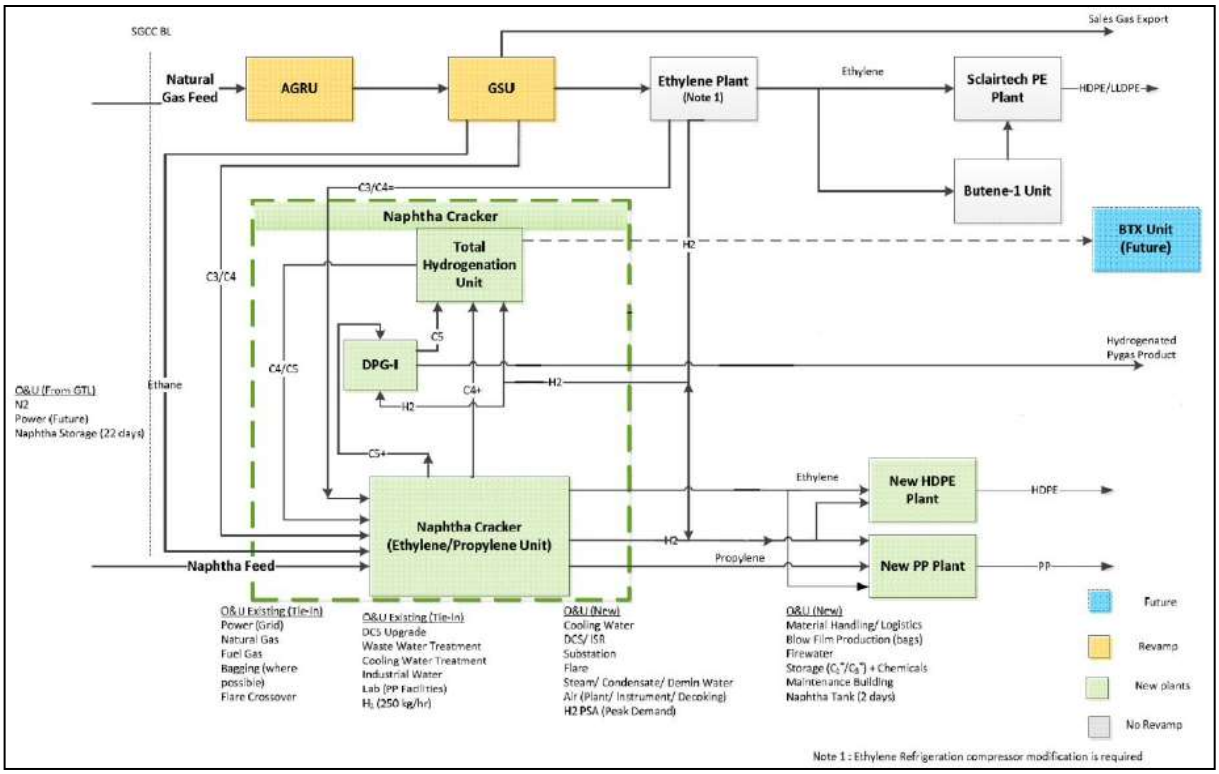
2. DESCRIPTION OF THE PROPOSED PROJECT

2.1 General Overview

The current plant operated by SGCC utilises natural gas from the Shurtan Gas field, to separate ethane and produce ethylene. The ethylene is converted into LLDPE, as the primary product. Currently 140 ktpa of ethylene and 125 ktpa of LLDPE is produced.

Future assessment of natural gas has identified an increase in ethane composition by up to 60% that can be processed to produce an additional 80 ktpa of ethylene. 430 ktpa Naphtha is available from the GTL plant. SGCC will install a Naphtha Cracker to process the Naphtha and excess ethane from the Gas Separation unit to produce 285 ktpa ethylene and 100 ktpa propylene. With this additional ethylene and propylene SGCC intends to install a new bimodal polyethylene unit and a polypropylene unit to produce additional 280 ktpa of HDPE product and 100 ktpa of polypropylene product.

The upgrades will ensure the Gas Treatment facility can reduce the CO_2 concentration in the gas leaving the Acid Gas Absorber to the desired level of 50 ppm as defined in the Basis of Design (BoD) (WP, 2017). Figure 4 and the following sections provide an overview of the upgrade project and the intended construction process.



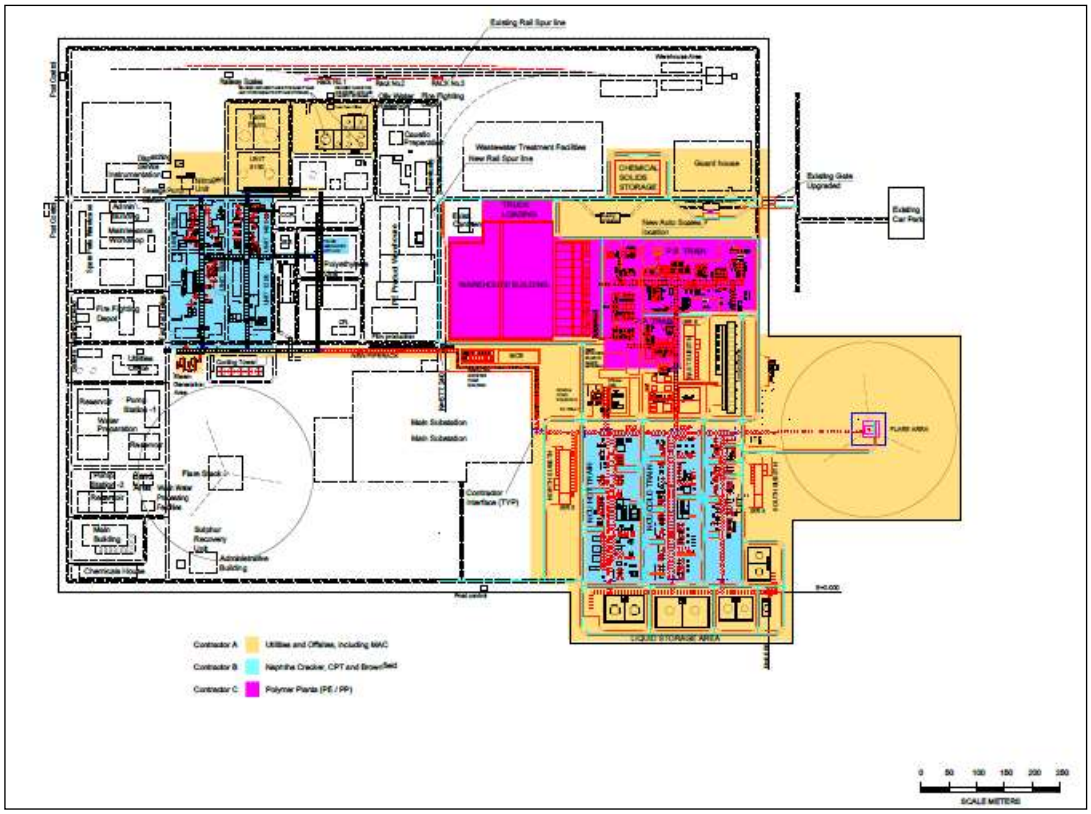
SGCC Block Flow Diagram. (WP,2017)

2.2 Current Site Status

2.2.1 Site Layout

The extent of the existing SGCC site is shown in Figure 5 and Figure 6 below.

4 Site Aerial Plan. (Source: www.bing.com/maps)



5 Site Layout Plan

2.2.2 Existing Onsite Equipment

The following process units are present on the SGCC site:

2.2.2.1. Acid Gas Removal, Gas Separation Unit and Ethylene:

- Bulk Acid Gas Removal Unit via Amine Treatment (Unit 1700);
- Gas Drying, Chilling and Demethanisation (Unit 1800);
- Pyrolysis Module (Unit 1100);
- Charge Gas Compression (Unit 1200);
- Charge Gas Chilling (Unit 1300);
- Ethylene Fractionation (Unit 1400);
- Propane Refrigeration (Unit 1500); and
- Ethylene Refrigeration (Unit 1600).
- Sulfur recovery unit (unit 7600)

2.2.2.2. Polyethylene and Butene-1:

- Reaction Area (Unit 2100)
- Recycle Area (Unit 2200)
- Finishing Area (Unit 2300)
- Butene-1 (Unit 3000)

2.2.2.3. SHELL SPENT CAUSTIC OXIDATION UNIT:

- Shell Spent Caustic Oxidation Unit (Unit 4000)

2.2.3 Existing Offsites / Utilities Units

In addition the following units and process areas are also present:

- Boiler Feed Water (Unit 6000);
- Cooling Water (Unit 6200);
- Steam Generation (Unit 6100);
- Demin Water (Unit 6300);
- Fuel Gas (Unit 6800);
- Plant Air , Instrument Air and Nitrogen Generation Unit (Unit 6600);
- Fire Water System (Unit 7000);
- Electrical Power Supply (Unit 7200);
- Waste Water Treatment (Unit 6400);
- Waste Oil Treatment (Unit 6401);
- Caustic Drain System (Unit 7400);
- Storage / Tank farm (Unit 8100); and
- Flare (Unit 6900).

2.2.4 Existing Processes

The following sections summarise the processes undertaken at the SGCC, illustrated within Figure 7.

2.2.5 Acid Gas Removal

Raw natural gas from the battery limit is routed to the Acid Gas Removal Unit (AGRU) which consists primarily of two columns, an Absorber and Amine Stripper amongst other associated equipment. The feed gas is contacted with a lean amine solution Diethyl Amine (DEA) in the Absorber to remove acid gases (Carbon Dioxide [CO_2] and Hydrogen Sulphide [H_2S]). The treated natural gas is then routed to the Gas Separation Unit (GSU) via the top of the column. The rich amine solution from the bottom of the column is subsequently routed to the Amine Stripper where acid gas is stripped from the solution and the amine recycled back into the Absorber. Amine solution is pumped back into the system to make-up for any losses. Acid gas is routed to the Sulphur Recovery Unit. The Sulphur Recovery Unit

is designed for the production and granulation of sulphur from hydrogen sulphide containing acid gases by direct oxygenation of hydrogen sulphide with air on a special titanium oxide catalyst (TiO_2).

2.2.6 Gas Drying, Chilling and Demethanisation

The treated natural gas from the Acid Gas Removal System is routed to the GSU where it is chilled, dried and further chilled before feeding the GSU Demethanizer. The several stages of chilling is done using a combination of propane refrigerant, ethylene refrigerant and return methane from the GSU cold box whilst the gas is dried in molecular sieve desiccant filled dryers.

In the GSU Demethaniser, methane is separated from ethane in a fractionation tower, with 95% of the ethane recovered. Reflux is provided by chilling against the lowest ethylene refrigeration level. Additional liquid methane is sent to the ethylene plant to provide chilling in the chilling train and Demethaniser.

The Demethaniser net overhead is reheated and compressed for export as sales gas. A small portion of the reheated Demethaniser overhead is used for regenerating the dryers in the Gas Separation, Ethylene and Polyethylene Units.

2.2.7 Dethanisation, Depropanisation and Debutanisation

The Demethanizer bottoms are routed to the GSU Deethanizer where ethane is removed in the overhead and sent to the Ethylene Unit as feedstock via the fractionating tower reflux drum. Ethane can also be condensed and stored in the GSU Deethaniser Reflux Drum when the ethylene unit is operating at a reduced capacity or to provide feed to the cracking heaters for an orderly shutdown

Deethaniser bottoms consisting of Propane and heavier components are routed to the GSU Depropanizer where it is flashed at lower pressure and fractionated to produce a propane overhead product and butane and heavier bottom product. The propane overhead is used intermittently to fill the propane refrigeration system.

Depropanizer bottoms is flashed at lower pressure and fractionated in the Debutanizer to produce a butane overhead product and Pentane and heavier bottom product, both of which are sent to product storage. All the refrigeration for the GSU is provided by the Ethylene Plant refrigeration compressor systems.

2.2.8 Feed System

The ethane rich feed exits the GSU Deethaniser as a vapour stream from the tower reflux drum. The vapour stream is preheated against natural gas in the Methane Reheater No.2 and is then sent to the cracking heaters via the ethane feed preheater.

Liquid ethane from the GSU Deethaniser Reflux Drum is vaporised and sent to the cracking heaters to supplement the ethane feed. This occurs when the GSU is operated at turndown conditions or to provide feed to the cracking heaters for an orderly shutdown. A steam heated exchanger will be used

to vaporise the stored liquid ethane. The vaporised ethane then is sent to the ethane feed preheater as described above.

2.2.9 Pyrolysis Module, Quench, Process Water Stripping and Ethane Feed Saturation

The ethane feed and recycled ethane stream are mixed and superheated with quench water before being sent to the Feed Saturator. In the Saturator, the total feed is saturated with water vapour by humidification to achieve the desired steam to oil ratio by direct contact with preheated circulating process water. Sulphur (as Dimethyl Disulphide [DMDS]) is injected into the total feed stream to the heaters to protect steam cracking coils against formation of coke and carbon monoxide. The humidified feed from the saturator is then mixed with steam and further heated before entering the heater.

Three SRT VI (Ethylene Heater / Reactor) heaters exist. Two heaters are in normal operation while the third is provided for continuity of operation when a heater is in the decoke cycle. The effluent from each radiant coil per heater is cooled individually via associated primary Transfer Line Exchangers (TLE) and combined and further cooled in secondary TLE's. This process generates SHP (Super High Pressure) steam in the primary TLE's via a thermosiphon system connected to a common steam drum for each heater. The boiler feedwater to the steam drum is preheated by flue gas in the convection section of the heater.

The subsequent combined hot cracked gas feed is routed to the Quench Tower, where it is cooled by direct counter current contact with water and sent to the first stage of charge gas compression. The condensed hydrocarbons fall to the bottom of the tower and are separated from the recirculating quench water. These condensed hydrocarbons are then cooled and sent to fuel. The hot recirculating quench water is used to supply low level heat to process users and the dilution stream pumped to a Direct Oxidation (DOX) unit where suspended solids and emulsified oil are removed from the process water.

2.2.10 Charge Gas Compression and Acid Gas Removal

The Quench Tower overhead vapours are compressed in a five stage centrifugal compressor with interstage cooling using cooling water. Condensed water and hydrocarbons from the compression system are collected and returned to the bottom of the Quench Tower.

In between the third and fourth stages of compression, acid gases are removed from the charge gas. The acid gas removal section consists of a two stage Caustic Wash Tower to provide complete removal of the acid gases. Each stage consists of a caustic circulation loop where caustic is pumped from the bottom to the top of the section. The Caustic Tower has a water wash section at the top to prevent entrained caustic from contaminating the compression system. Steam condensate is cooled and used as wash water and as dilution and makeup for the circulating caustic sections. Spent wash water is initially used to meet dilution water requirements for the circulating caustic sections prior to being sent to Outside Battery Limits (OSBL) for further treatment. Any additional water required for dilution will be supplied by condensate from the SHP steam continuous blowdown drum.

Spent caustic from the bottom of the Caustic Tower is sent to the Spent Caustic Oxidation unit for further treatment. Any yellow oil formed in the caustic tower bottom is periodically removed to disposal drums.

The fifth stage discharge is cooled by cooling water and then chilled by propane refrigerant prior to entering the Charge Gas Dryer Feed Drum. The vapour overhead is sent to the Charge Gas Dryer, and the condensed water and hydrocarbons are fed to the Charge Gas Compressor Fifth Stage Suction Drum.

2.2.11 Charge Gas Dryer

Charge gas from the Dryer Feed Drum is dried in a two vessel molecular sieve drying system. One vessel is onstream while the other vessel is regenerated in a cyclic operation. Part of the hydrogen / methane off gas from the recovery section plus a portion of natural gas from the GSU is heated by high pressure steam and used to regenerate the desiccant in the Charge Gas Dryers, the Natural Gas Dryers, the Ethylene Dryer and the FE Column Dryers in the Polyethylene Unit. After regeneration, the gas is cooled and sent to the fuel system. Any condensed water is sent back to the Quench Tower.

2.2.12 Chilling Train

The vapour from the Charge Gas Dryer is progressively chilled by heat exchange with process streams, and propane and ethylene refrigerant before being routed to Demethanizer Feed Separators 1, 2 and 3. Condensate from these separators provides feed to the Demethanizer.

The charge gas from Demethaniser Feed Separator No.1 is chilled by off-gases in the chilling cold box and the coldest level of ethylene refrigerant. The gas is further chilled by heat exchange with hydrogen/methane off-gas and liquid methane produced in the GSU from the Demethanizer Feed Separator 2. The condensate is then separated in Demethanizer Feed Separator No.3, which provides the coldest feed to the Demethaniser.

After reheating in the off-gas exchangers, the hydrogen rich gas from Demethaniser Feed Separator No.3 is split into three streams. The first stream is sent to the Pressure Swing Absorption (PSA) Unit which provides high purity hydrogen for the acetylene converter and for the Polyethylene Unit. PSA off-gas is sent to the cracking heaters fuel gas system. The second stream is sent to OSBL and to the liquid fuel vaporization system. The remaining hydrogen rich stream from Demethaniser Feed Separator No.3 is reheated in the off-gas exchangers and combined with sales gas before being used for dryer regeneration. It is ultimately routed to the fired steam boiler fuel system.

2.2.13 Charge Gas Demethanisation

The feeds from the charge gas chilling train are sent to the appropriate packed bed section of the Demethaniser. The Demethaniser is operated at a pressure high enough for the methane offgas to enter the fuel gas system.

The Demethaniser is reboiled with charge gas in a bottoms reboiler. The tower overhead vapour is partially condensed by heat exchange with liquid methane produced in the GSU Demethaniser. The Demethaniser net overhead is reheated in the offgas exchangers and combined with the reheated hydrogen offgas from the Demethaniser Feed Separator No.3. The hydrogen / methane offgas is combined with sales gas and used for regenerating the dryers before being routed to the fired steam boiler fuel system. The vaporised liquid methane from the GSU is reheated in the offgas exchangers and combined with PSA offgas before being sent to the cracking heaters fuel gas system. The Demethaniser bottoms are pumped and split into two streams. One is sent to the upper feed tray in the Deethanizer after reheating against ethylene refrigerant and by two stages of propane refrigeration. The other stream is reheated against ethylene refrigerant and by four stages of cold recuperation against propane refrigeration before being sent to a lower feed tray in the Deethaniser.

2.2.14 Deethaniser, Acetylene Conversion and Ethylene Fractionator

The Demethaniser bottoms product feeds the Deethaniser. The Deethaniser reflux is supplied by partially condensing the overhead with propane refrigerant whilst the reboiling duty is provided by saturated low pressure steam. The deethaniser bottoms, which is used as liquid fuel, is sent to storage.

Acetylene is removed from the net Deethaniser overhead by selective hydrogenation to ethylene and ethane. The Acetylene Converter is designed with one bed of hydrogenation catalyst. A spare catalyst vessel is provided so that the catalyst may be regenerated with a mixture of superheated steam and air without interrupting the continuity of operation.

Hydrogen is added to the Deethaniser net overhead and then preheated against converter effluent and low pressure steam. The preheated stream is then passed over the catalyst bed. The converter effluent is then cooled progressively by heat exchange with cooling water, and with converter feed.

A by-product of the reaction is green oil which is a polymer of acetylene. Green oil interferes with the proper drying of the ethylene fractionator feed which is essential to avoid icing problems. To eliminate green oil, the cooled effluent from the Acetylene Converter is contacted with a liquid ethylene / ethane stream from the Ethylene Fractionator upstream of the C2 Green oil drum and then flashed in the drum. The liquid leaving the drum is pumped back to the Deethaniser. The green oil passes out with the Deethaniser bottoms and the vapour from the drum passes to the Ethylene Fractionator via a molecular sieve dryer. The Ethylene Dryer is a single vessel which requires bypassing when the dryer is regenerated. The Ethylene Fractionator has a bottoms reboiler and a side reboiler. The bottoms reboiler is heated by condensing propane refrigerant. The side reboiler is heated by charge gas.

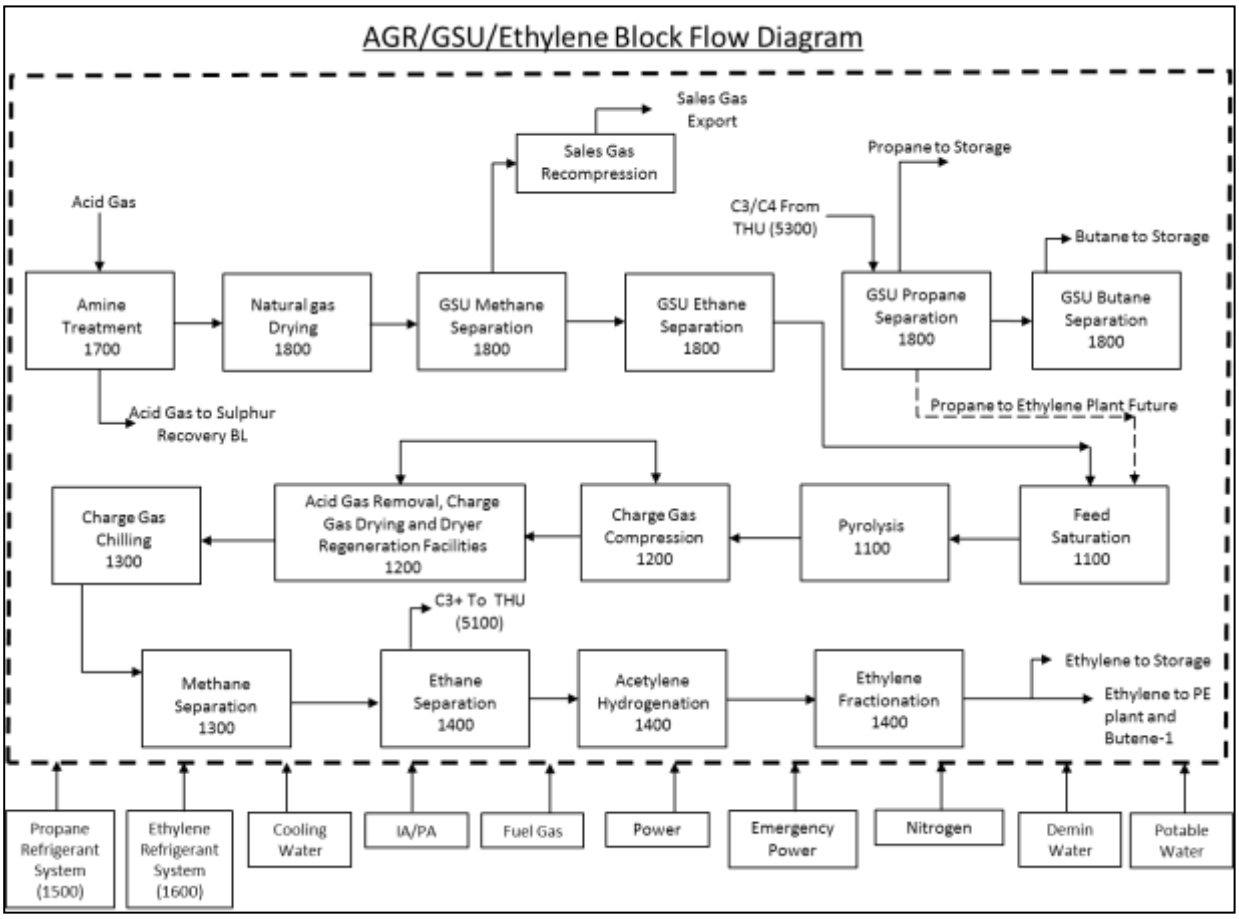
Ethane leaving the Ethylene Fractionator bottoms is recycled back to the Cracking Heaters after being vaporised by charge gas, and combined with vaporised treated fresh feed and then heated by quench water. The Ethylene Fractionator overhead is condensed with propane refrigerant. Hydrogen / methane off-gas from the Acetylene Converter and the equilibrium concentration of ethylene are vented to the third stage of the charge gas compressor from the reflux drum. Ethylene product leaves the fractionator as a side-draw a few trays below the top of the tower and is sent to storage. From storage ethylene is reheated against offgas streams and propane refrigerant and sent to the Polyethylene Unit.

2.2.15 Propane Refrigeration

The Propane Refrigeration System is a closed four stage system which utilizes a steam turbine driven centrifugal compressor to provide refrigeration for process gas. The system provides refrigeration at four temperature levels between -37°C and 13°C and provides refrigeration for both the Ethylene Unit and the GSU.

2.2.16 Ethylene Refrigeration

The Ethylene Refrigeration System is a closed three stage system which utilizes a steam turbine driven centrifugal compressor to provide refrigeration for process gas. The system provides refrigeration at four temperature levels between -101°C and -62°C and provides refrigeration for both the Ethylene Unit and the GSU. Dry gas seals are provided for both refrigeration compressors eliminating the possibility of compressor seal oil entering the system and freezing.



6 Existing Processes Flow Diagram (WP (1), 2016)

2.3 Upgrade Project Description

2.3.1 Overview

The aim of the SGCCUP is to increase the ethylene production capacity from the current level of 140 ktpa by an additional 285 ktpa and add propylene production of 98 ktpa. This is achieved using a feed of 400 kta of naptha from the nearby GTL plant and by increasing the Ethane content in the natural gas feed to approximately 60%. In addition, 430 ktpa of naphtha feed from the GTL Project will also be introduced. As a result of the additional ethylene a new Polyethylene Plant will be established for the production of bimodal high density polyethylene (HDPE) of 280 ktpa and polypropylene of 100 ktpa. This additional ethylene will be utilised for polyethylene production in a new bimodal Polyethylene Plant.

The upgrades will ensure the Gas Treatment facility can reduce the CO_2 concentration in the gas leaving the Acid Gas Absorber to the desired level of 50 ppm as defined in the BoD (WP, 2016).

2.3.2 Project Components

Table 2 and Figure 8 below provide a summary of the facility upgrade details for the project:

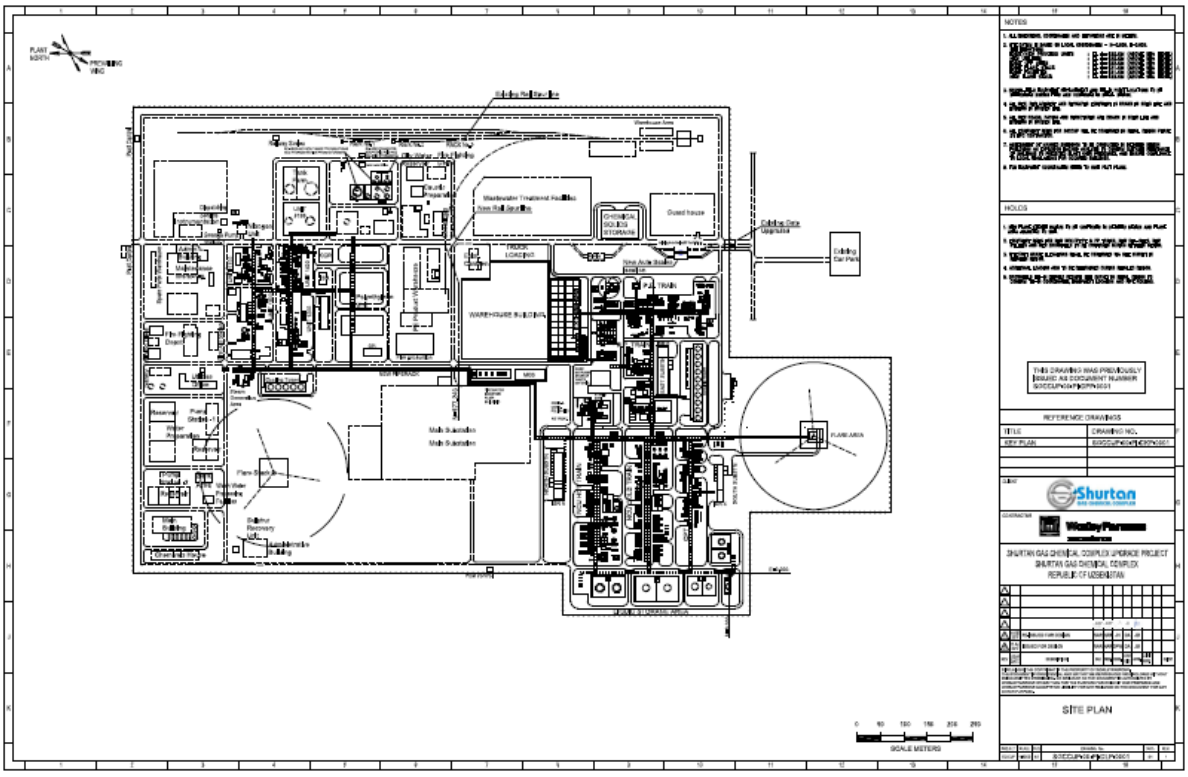
Table 2 – Facility Upgrade Details

Facility	Upgrade Details
Acid Gas Removal Unit (AGRU)	Upgrading of the AGRU will be by Dow Amines to replace the existing DEA solvent and changing out the Absorber Packing. This upgraded process is required to meet the BoD specification including CO_2 concentration in the purified gas stream being less than 50 ppm.
Gas Separation Unit (GSU)	The GSU will be upgraded by revamp of existing units to account for the increase in Ethane concentration. The following major equipment and their associated equipment will be revamped / replaced: ▪ Demethaniser (internals only); ▪ Methane Reheater No.1 and No. 2 (Replaced); ▪ Demethanizer Feed Knockout Drum (Replaced); ▪ Demethanizer Side Reboiler (Replaced); ▪ Demethanizer Condenser (Replaced); ▪ Natural Gas Recompressor Aftercooler (Replaced); ▪ Ethane Feed Vaporizer No. 2 (New); ▪ Start Up/Make Up Propane Pump (New); ▪ Cold Box (New installation); ▪ Exchangers/Condensers; and ▪ Tie-ins to / from new NCU / Ethylene / Propylene Units.
Existing Ethylene Unit	There will be an Upgrade to the Ethylene Refrigeration Compressor and refrigerant condenser for GSU revised duties. New tie-ins required to/from NCU: • From PSA; • From deethaniser bottoms; • From ethylene product pumps; • From ethylene fractionator overhead; and • To ethylene storage spheres.

Facility	Upgrade Details
Naphtha Cracker Plant (Ethylene / Propylene Plant)	The Naphtha Cracking Plant consists of three major units: Ethylene Unit (EU), C4/C5 Total Hydrogenation Unit (C4/C5 THU) and Gasoline Hydrogenation Unit (DPG-1). The EU is designed to produce the ethylene and propylene production; the C4/C5 THU is designed to totally hydrogenate the C4/C5 components into paraffins for recycle cracking; and the DPG-1 is designed to partially hydrogenate all Pyrolysis Gasoline produced in the EU. Note the new EU is also referred to as the 'Naphtha Cracking Plant' is also referred to as the Ethylene / Propylene Plant.
New Polyethylene Unit	New unit, utilizing a Slurry Based Bimodal (Dual Reactor) HDPE Technology, which includes material handling sections (conveying, blending, storage, bagging, rail and truck loading and warehousing); film production for bagging; jumbo bags for bagging; roads; offsites and utilities.
New Polypropylene Unit	New unit, which includes material handling sections (conveying, blending, storage, bagging rail and truck loading and warehousing); roads, offsites and utilities.

Offsites & Utilities	New Units comprise:
	• HP Steam Boiler;
	• Flare dedicated to the new facilities;
	• Multi-cell cooling water tower;
	• Thermal oxidiser unit for the polyethylene;
	• N2 Booster Compressor;
	• Air Separation Unit (ASU);
	• Steam System (HP/MP/LP) dedicated to new process facilities, to include the following:
	  ○ HP Steam Boilers;
	  ○ Deaeration Package;
	  ○ LP Condensate Treatment;
	  ○ Polishing Package;
	  ○ Demin H_2O Treatment.
	• Substations and remote instrument buildings;

Facility	Upgrade Details
	• Addition of effluent pre-treatment unit on the polymers units; • Iso-Butane Solvent Storage tank and loading/unloading pumps; • H1 Storage tank and loading/unloading pumps for internal use and export; • Naphtha Storage Tank; • Ethylene Storage Tank; • Propylene Storage Tank; • Raw Pygas Storage Tank; • Hydrogenated Pygas Storage Tank; • Methanol Storage Tank (to be confirmed); and • Addition of Miscellaneous Chemicals Storage Tanks.
Catalysts & Chemicals	Assessment of existing chemicals for the AGRU and GSU process areas and the catalyst for the existing Acetylene Converter shall also be assessed.



7 Shurtan Site Plan (WP 2017)-

2.3.3 Greenfield and Brownfield Development

The project upgrade works will be divided between the existing brownfield area of the SGCC and a greenfield location to the immediate east of the existing complex, within the existing site boundary of the SGCC site.

The following works will be completed in the greenfield area:

- New Ethylene / Propylene Unit / Naphtha Cracker Plant including THU;
- New supporting facilities;
- New Polyethylene Unit; and
- New Polypropylene Unit.

The Brownfield work in the existing operations area will comprise the following scope:

- Upgrade of the AGRU;
- Upgrade of the GSU;
- Upgrade of the Ethylene Plant; and
- Process and services tie-ins.

2.3.4 Facilities Operational Lifespan

The facilities shall be designed for a life of 25 years. The plant on-stream time is 8,000 hours per year.

2.4 Other Project Infrastructure

2.4.1 Waste Management

Stocking and long storage of different waste streams is currently carried out on an engineered landfill located at a distance of 3 km from SGCC location. The landfill represents a flood-free, slightly inclined plain with area of 5 hectares divided into Area 1 and Area 2:

2.4.1.1. AREA 1

Area 1 is divided into plots separated by concrete roads, into which solid domestic waste is deposited by dumper truck and then covered by a layer of soil. Approximately 687 tonnes/year of domestic waste is generated in different production units from the SGCC and about 336 tonnes/year is received from the shift camp. The waste streams also include less hazardous wastes including:

- Coagulant slime;
- Puddle sediment
- Used cationite;

- Used anionite; and
- Used anthracite.

2.4.1.2. AREA 2

Area 2 is equipped with special vessels and bunkers to store the following waste types:

- Activated carbon;
- Molecular sieve;
- Used catalysts;
- Sodium salts;
- Used silica gel;
- Highly-viscous fuel;
- Used aluminium oxide; and
- "Yellow oil".

2.4.1.3. SGCC WASTE STREAMS

Within the SGCC site different waste categories are temporarily stored in 14 different locations. The area of waste storage at each location is different and varies between a few m^2 to a few hundred m^2. The waste is stored for about 1 week before dispatch to the landfill. Presently about 36 different waste streams are generated from the SGCC as a result of the existing plant and utilities operations. The total amount of the current waste streams is estimated as follows:

- Solid waste: 6,803 tonnes/year;
- Liquid wastes: 1,356 tonnes/year; and
- Sludge: 772 tonnes per year.

Furthermore, about 1,077 tonnes/year of domestic and food waste is produced in the camps and manned quarters.

Operation of the new Polymer and Naphtha plants will result in generation of additional waste streams. The existing landfills and waste receiving facilities does not have sufficient capacities to receive additional waste generated by new facilities. Sufficient land areas are available for expansion and enhancement of the existing waste management facilities. Therefore, expansion of waste management facilities will be considered by design in order to address increasing quantities of waste streams.

2.4.2 Water Supply

The SGCC sources water from the KMC. Water is diverted from the Amu Darya River to the Talimardzhan reservoir by the Karshi pump stations, which were built between 1973 and 1988. There

are 7 pump stations in total, which lift circa 5 billion cubic metres annually (Golders, 2014). The Talimardzhan Reservoir feeds the KMC which supplies water to irrigators and towns.

The primary water supply is abstracted from the KMC via a pumping station and 25 km pipeline (1020 mm diameter) to a second pumping station for distribution to the facility and also for irrigation of forestry in the sanitary zone. A second water abstraction from the KMC is distributed to the artificial SGCC Reservoir (11.5 mm^3 capacity) located 3 km to the northeast of the complex. The reservoir provides two winter months back-up water supply for the project and is fed via a pumping station and 13 km pipeline.

Water is required to meet production and domestic requirements. The production water supply demand is 21,600 m^3/day (250 L/s) (SGCC 4, 2016). Most water (approximately 50%) is used in the cooling tower (SGCC (4), 2016) The remaining water is used in the process facilities, for producing demineralised water, and for flushing of filters and preparation of solutions (approximately 25%). Domestic water demand is 1204 m^3/d (14 L/s).

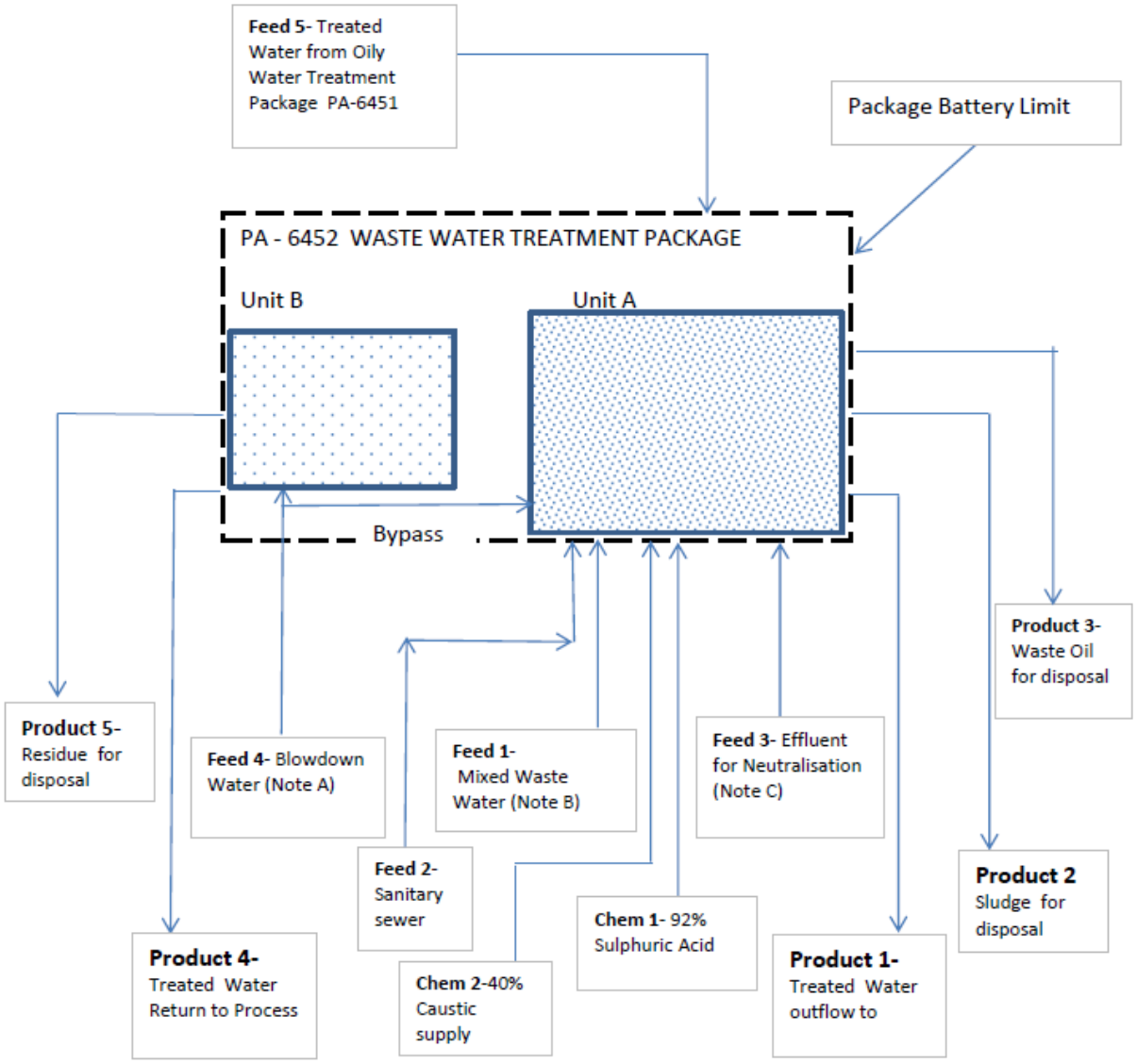
The maximum design volume and permitted abstraction of the KMC water intake is 29 mm^3/yr (approximately 900 L/s) (SGCC (4), 2016).

It is reported that the average annual water usage for the SGCC complex was 13.9 mm^3/yr (442 L/s) for the period 2007 to 2009 (Golders, 2014). However, it should be noted that Golder (2014) identify the SGCC Reservoir as the greatest water user (56% of total) followed by local irrigation (36%) with SGCC production using only 5% of the total (approximately 22 L/s). The current and future water usage for the project requires clarification, together with the confirmation of the facilities intended lifespan and decommissioning proposals.

2.4.3 Waste Water Treatment

Currently permitted waste water is discharged at two outlets into the export drainage YK canal (South canal). One outlet discharges clean effluent that requires no pre-treatment (260 m^3/hr or 72 L/s). The second outlet discharges treated industrial and domestic effluent (109 m^3/hr or 30 L/s). Treatment includes physical, chemical, mechanical, and biological processes.

The Waste Water Treatment Package is required to treat a number of waste water stream feeds from unit processes within the new facility, shown in Figure 9. The Waste Water Treatment Package is required to separate and remove solids and contaminants from the process for safe disposal by site personnel.



8 Waste water streams (Ref. SGCCUP-64-ME-DAS-6452)

2.4.4 Other Utilities Infrastructure

2.4.4.1. Air Emissions

Gas fired combustion equipment including the cracking heater, steam boiler and flares are the key point sources of the atmospheric emissions from the site. Combustion of large quantities of fuel gas in the cracking heater during normal and decoking operations and within the boiler will result in emissions of nitrogen dioxides (NO_x), particulate matter (PM_{10}), carbon dioxide (CO_2) and water vapour. Sulphur dioxides (SO_2) emissions from the combustion sources depend on the levels of hydrogen sulphide (H_2S), estimated to be 20 mg/m^3 maximum. Flue gas emissions (comprising the above mentioned gases and water vapour) from the cracking heater may exceed 343,000 kg/h and 360,000 m^3/h during normal and peak operations respectively.

Addition of a new flare for the polyethylene upgrade will increase the intermittent flue gas emissions. However, the increase in flaring emissions will not be proportional to the increase in plant capacity. The new flare unit can be operated in conjunction with existing flare to provide a maintenance load from one system to the other.

Off gas emissions are also expected from the acetylene regeneration and amine unit. Off gas emissions in the new plant is estimated to be approximately 7,300 kg/h that will be discharged to the atmosphere at approximately 450°C. The C4/C5 emissions to the atmosphere are expected to be about 6,000kg/h that will be emitted from hydrogenation reactor regeneration.

Acid gas from the Amine unit is estimated to be more than 22000kg/h that will be sent outside the plant battery limit for disposal. These emissions will be assessed as part of the ESIA with all other emissions irrespective of the disposal location.

Addition of the new cooling tower has potential to disperse approximately 8m^3/h of alkaline water that will result in deposition of the chlorides and sulphates, containing-water droplets, entrained by the cooling tower exhausts, in the surrounding area.

Continuous vents and fugitive emission of hydrocarbons from valves, flanges and compressor seals are the key emissions to atmosphere that contribute to greenhouse gas emissions and global warming in addition to the impacts on the local air quality.

According to the Reference Document on Best Available Techniques (BAT) in the Production of Polymer, (EC, 2007), the following emissions are expected from the SGCCUP plant:

- Dust emissions: 6.5 tonnes/year (based on 17 grams per tonne of production);
- Volatile oganic compound (VOC) emissions: 254 tonnes/year (based on 1.27 kg per tonne of production).

2.4.4.2. NOISE

As detailed within the BoD (WP, 2017) the noise level at a distance of 1 m from the equipment should not exceed a value of 80 dBA. This means that sound pressure levels at human receptors around plant are unlikely to be significant. However, during the emergency situations excessive noise may be generated by the pressure relive valves and flares.

2.5 Construction Phase

2.5.1 Construction Strategy

The proposed construction strategy for SGCCUP is to maximize on-site pre-assembly at an area local to the SGCCP. It is the intention for site preparation and early works to be started as early as practical.

The construction strategy aims to minimize on site-construction activities through:

- Pre-Casting of foundations, concrete supports, cable ducts and surface storm drains;
- Offsite fabrication of structural steelwork and pipe supports for on-site sub-assembly / erection;

- Plant, equipment, and column dressing would be completed as far as possible in the manufactures facilities, including installation of vessel internals / trays. .

2.5.2 Early Works

The early construction works within the SGCCUP plant boundaries will include:

- Plant site levelling, grading and compaction.
- Installation of plant road base courses.
- Installation of all security fencing (both permanent and temporary), pedestrian and vehicle access / egress gates, security control, plus security gate houses.
- Installation of underground section of the 56 inch cooling water (flow and return).
- Installation of the buried sections of the fire main / underground services.
- Installation of buried earthing cables.
- Installation of the pre-cast concrete cable ducts.

2.5.3 Construction Accommodation Camp

HOLD - Confirmation concerning the requirements of the construction accommodation camp e.g. construction programme is awaited.

- Based on the SGCCUP FEED Constructability Report (WP, 2017) the construction accommodation camp will be based on the following aspects, if confirmed to be required as part of the scope:
  Construction personnel: Phase 1: 2,000 people and Phase 2: 4,400 people, housed in a total of 6,400 rooms (single, double and dormitory style);.
- Land area to cover approximately 500 m x 500 m;
- In addition to accommodation the temporay construction facilities will comprise:
  - Dining rooms;
  - Health centers;
  - Laundry;
  - Medical center;
  - Administration office;
  - Fire house;
  - Vegetable storehouse;
  - Parking;
  - Shelter shed;
  - Security check-point;

- Water treatment area of drinking and household fire water line;
- Utility sewerage treatment facilities;
- Solid domestic waste storage area; and
- Sports ground.

- Planned temporary buildings for industrial and storage areas:
  - Offices;
  - Medical center;
  - Electromechanical shop;
  - Warehouses (outdoor and indoor);
  - Reinforcing shop;
  - Formwork shop;
  - Fuel filling station;
  - Pipe shops;
  - Paint shops; and
  - Sandblasting shop.
- I0 to 12 month completion and commissioning programme.
- Energy demand in peaks:
  - Electricity – 8.9 MWt;
  - Water consumption for utility and drinking water system is 932 m^3/day. Water demand for construction is 220 m^3/day; and
  - Gas consumption is 1,630 m^3/day.

2.5.4 Other Construction Facilities

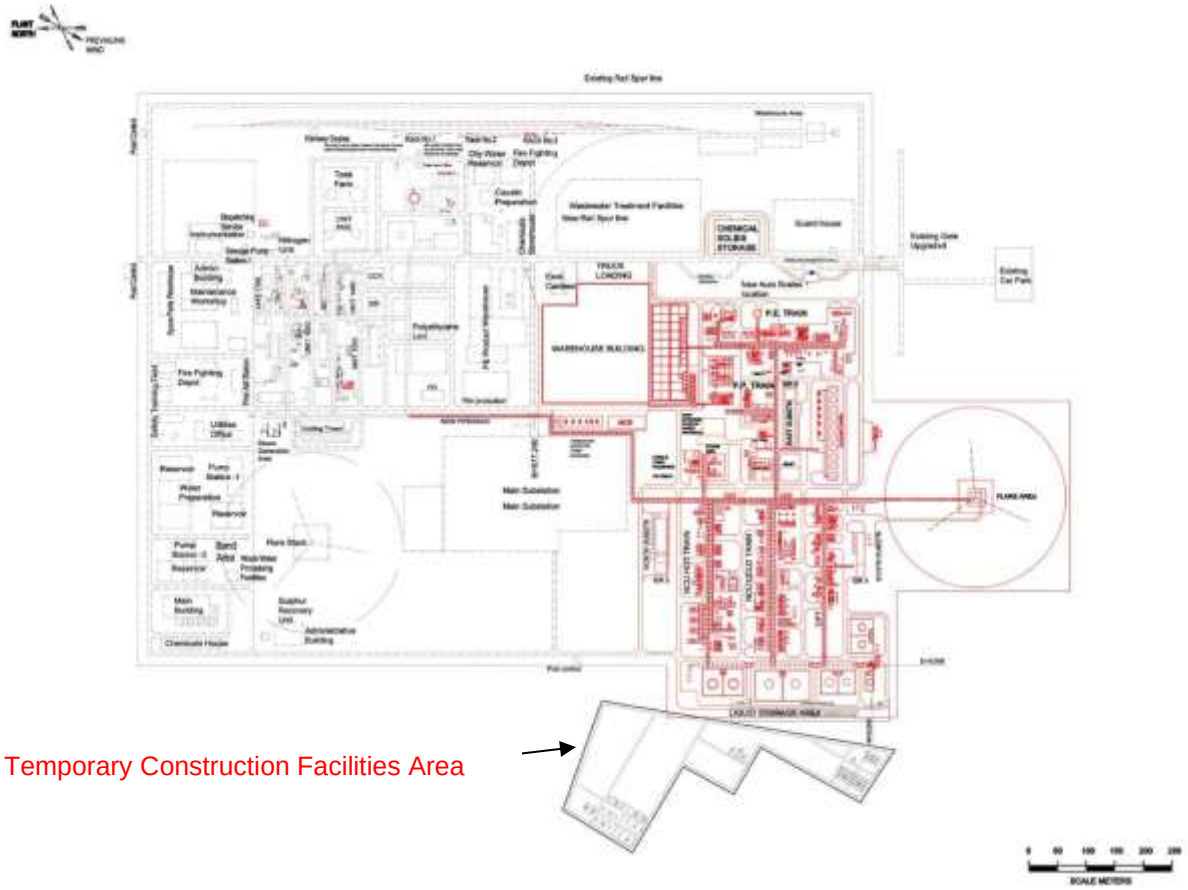
The following other construction facilities will be required as part of the SGCCUP:

- Concrete batch plant;
- Approved Concrete Testing Facility;
- Pre-Cast concrete yard;
- Piping fabrication shop, with blasting and painting facilities;
- Pipe spool lay-down area;
- Pre-assembly area (for structural steel work);
- Pre-assembly area (for plant, and equipment, including vessel dressing);

- Canteen facilities;
- Toilet facilities;
- Construction fuel storage area;
- Gas bottle storage area;
- Construction / haul roads;
- Burrow pits / construction refuge dump; and
- Allocated surplus spoil dump.

2.5.5 Temporary Construction Facilities Land Area

The land area required for the temporary construction facilities is envisaged to require 2 / 3 times the new plant boundary size. This would make the area required for the temporary construction facilities between 2 to 3 km^2.



9 Temporarty Construction Facilities Location

3. PROJECT ALTERNATIVES

3.1 Overview

3.2 'No' Project Alternative

The no-go alternative or nominal base case for the SGGC if the upgrade project did not go ahead, would be the continued operation of the complex at its current production level. There would be no change or modernisation of equipment, design technology or polyethylene production output in the base case approach.

3.3 Project Alternatives

3.3.1 Concept Design Alternatives

During the FEED 1 Concept the SGCCUP considered three design alternatives (WP, 2016), for the major works to the following units is shown below:

- AGRU;
- GSU;
- Ethylene Unit; and
- Polyethylene Unit.

The options considered for these are summarised below and generally comprised consideration of:

- New internals;
- Equipment replacement; or
- New parallel units.

No further concept design alternatives have been considered as part of the FEED2 updated Scope of Works.

3.3.1.1. NEW INTERNALS

Provision and changing of new internals was considered to be the easiest upgrade option considered, as would limit impact to existing ongoing operations and would allow the same access for future maintenance. The new internals design option was applicable to packing, pump impellers and provision of bigger drives. The new internals works could be undertaken through either local plant isolation or temporary shutdown.

3.3.1.2. EQUIPMENT REPLACEMENT

Improvements to the technology of the equipment were considered as part of the upgrade. This was either direct replacement of similar sized equipment e.g. where nozzle sizes and geometry were similar. Where there is an intended increase in volumetric throughput, replacement was with a larger piece of equipment. Where a larger piece of equipment was required the foundation footprint would

also require upgrade, increase to its size and adaptions to the fireproofing. To undergo equipment replacement the original equipment would be required to go offline to allow the replacement to be completed.

3.3.1.3. NEW PARALLEL UNIT

A new parallel unit to be tied into the existing operating unit was considered predominantly for the Ethylene Unit. Addition plot space is required for this design option, to ensure it can be connected to the existing piping run. This will also require tie-ins to hook up associated parallel units. There will be a loss of access for maintenance in consideration of this option.

3.3.2 Upgrade Alternatives

3.3.2.1. ACID GAS REMOVAL UNIT

There are many issues downstream of the AGRU relating to high CO_2 in the gas. The CO_2 % specification in the SGCC project is lower than the current operational composition (3.5%), but higher than the original specification (2.5%). An upgrade to this unit was recommended, as the impact of high CO_2 in the downstream unit is so significant.

3.3.2.2. GAS SEPARATION UNIT

Ethane increase in the Natural Gas is balanced by the lower C3+ components in the gas. This means that the demethaniser and demethaniser requires debottlenecking, whereas the dethaniser, depropaniser and debutanizer have reduced throughput. The remaining ethane sized units have a significant impact due to the 60% increase in ethane. Upgrading of this unit was not considered too extensive.

3.3.2.3. ETHYLENE UNIT

At the outset of the FEED1 phase it was anticipated that the Ethylene Plant could be upgraded with relatively small changes; the most significant being an additional Ethylene furnace. After further review, it was understood that the 60% increase in volumetric flow through the Ethylene Plant would incur a major upgrade. Three options were evaluated as follows:

- Option 1 – Complete Upgrade of all existing facilities (220 ktpa);
- Option 2 – Upgrading of the Pyrolysis Section of the Ethylene Plant (220 ktpa) and a new Ethylene conditioning train (80 ktpa); and
- Option 3 – A complete new Train of Ethylene unit (80 ktpa).

The recommendation was made to revise Option 2, to revamp the Pyrolysis section up to the quench column and install a new 80 ktpa ethylene train (including a new Charge Gas Compressor and Binary Enhanced Refrigeration).

3.3.2.4. NEW POLYETHYLENE FACILITY

Initial considerations were limited to upgrading the existing Polyethylene unit to a bimodal LLDPE and HDPE unit using NOVA SCLAIRTECHTM technology. It was decided to abandon this consideration

from further study due to lack of similar upgrade history which could meet SGCC's needs. Both Gas Phase or Slurry Phase technologies were evaluated and the Slurry Phase technology was selected as the best option for the SGCCUP new Polyethylene Unit.

Options for utilizing the existing or providing new bagging, storage and warehousing facilities were considered as part of the design concept.

3.3.3 FEED2 Revised Scope of Works Alternatives

No further concept design alternatives have been considered as part of the FEED2 Updated Scope of Works, with the exception of the revisions stated below:

- Ethylene Train – This is no longer part of the upgrade project, although will be some modifications to the refrigerant compressor;
- The increased ethane production will be processed alongside imported naphtha in the new Naphtha Cracker Unit (NCU);
- The NCU will feed Polyethylene Plant and Polypropylene Plant; and
- Utilities and Offsites will be provided for the new process facilities which may be stand alone or may be integrated with existing.

3.3.4 Site Alternatives

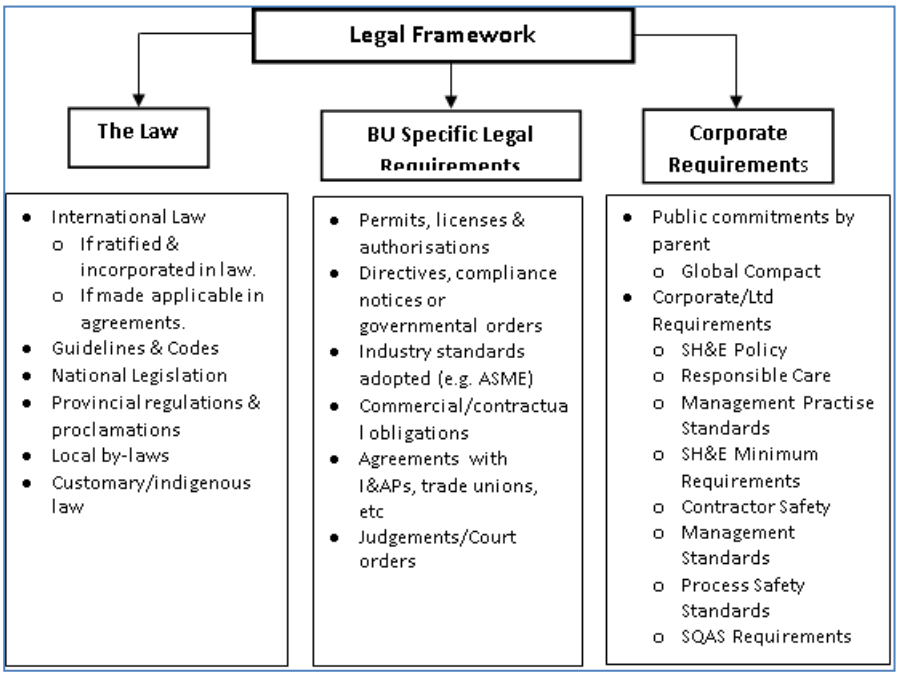
No site alternatives were considered as part of the upgrade project.

4. LEGISLATIVE & REGULATORY FRAMEWORK

4.1 Introduction

This Chapter details the legal and administrative framework applicable to the SGCCUP covering the environmental regulatory framework in Uzbekistan and the regulations, standards and guidelines (national and international), applicable to the project. The SGCCUP will conform to the following requirements in accordance with Figure 10 below:

- Uzbekistan regulatory environmental standards and management directives;
- International Finance Corporation (World Bank Group) Social & Environmental Performance Standards and the IFC EHS General Guidelines;
- Good International Industry Practice following the approach of the OECD Common Approaches (2016); and
- Corporate requirements from SGCC and their partner companies.



10 EHS Legal Framework (WP,2016 – Basis of Design)

4.2 National Legislation

4.3 Constitution of the Republic of Uzbekistan

The Constitution of the Republic of Uzbekistan was adopted on 8th December 1992 (and amended in 2009, 2016 and 2017 years) and oversees the hierarchy of the principal sources of law in Uzbekistan as follows:

- Constitutional laws (highest importance);
- Ordinary laws;
- Decrees of the President;
- Decrees of the Cabinet of Ministers; and
- Regulatory Acts.

4.3.1.1. Environmental Protection Provisions in Constitution

The Constitution defines the following articles relevant to environmental protection:

- Article 50: Citizens shall be obliged to protect the environment.
- Article 54: The use of any property must not be harmful to the ecological environment nor shall it infringe on the rights and legally protected interests of citizens, juridical entities and the state.
- Article 55: The land, its minerals, waters, fauna and flora, other natural resources shall constitute the national wealth and shall be rationally used and protected by the state.
- Article 100: The joint conducting of the local bodies of authority shall include: ensurance of legality, legal order and security of citizens; matters of economic, social and cultural development within their territories; formation and implementation of the local budget, determination of the local taxes and fees, formation of non-budget funds; direction of the municipal economy; protection of the environment; ensurance of the registration of civil status acts; adoption of normative acts and exercising other powers which are not contrary to the Constitution and legislation of the Republic of Uzbekistan.

4.3.1.2. Socioeconomic Provisions in Constitution

Part 2 of the Constitution focuses largely on basic human and civil rights, and economic rights. Key articles related to socioeconomic aspects are:

- Article 4: The Republic of Uzbekistan shall ensure a respectful attitude toward the languages, customs and traditions of all nationalities and ethnic groups living on its territory, and the creation of the conditions for their development.
- Article 18: All citizens of the Republic of Uzbekistan shall have equal rights and freedoms, and shall be equal before law without discrimination by sex, race, nationality, language,

religion, social origin, convictions, individual and social status. Any privileges may be granted solely by law and must conform to the principles of social justice.

- Article 37: Everyone shall have the right to work, free choice of work, fair conditions of labour and protection against unemployment in the procedure specified by law. Any forced labour shall be prohibited except for punishment under the sentence of a court or some other instances stipulated by law.
- Article 39: Everyone shall have the right to social security in old age, in the event of disability and loss of the bread-winner, as well as in some other cases specified by law. Pensions, allowances and other kinds of welfare may not be lower than the officially fixed minimum subsistence wage.
- Article 40: Everyone shall have the right to skilled medical care.
- Article 41: Everyone shall have the right to education. The state shall guarantee free secondary education. Schooling shall be under state supervision.
- Article 42: Everyone shall be guaranteed the freedom of research and engineering work, the right to enjoy cultural benefits. The state shall promote the cultural, scientific and technical development of the society.
- Article 43: The state shall safeguard the rights and freedoms of citizens proclaimed by the Constitution and laws.
- Article 44: Everyone shall be entitled to legally defend his rights and freedoms, and shall have the right to appeal any unlawful action of state bodies, officials and public associations.
- Article 45: The rights of minors, the disabled and the single elderly shall be protected by the state.
- Article 46: Women and men shall have equal rights.

4.3.1.3. HEALTH & SAFETY PROVISIONS IN CONSTITUTION

No specific health and safety provisions are defined in the Constitution.

4.3.2 National Environmental Protection Legislation

Tables 3, 4 and 5 below details National Legislation pertaining to environmental protection in Uzbekistan.

Table 3 – Summary of Relevant Environmental Protection Legislation

Area	Law / Regulation	Summary
General Environmental Protection	Law on Nature Protection (9/12/1992 No 754-XII) last amended 04.09.2014 (No. ZRU 373)	Basic environmental law. Implemented by resolutions defined in Table 3 below.

Area	Law / Regulation	Summary
	Law on Protected Natural Areas dated 3/12/2004 No 710-II last amendment was made on 04.09.14 (№ZRU 373)	Facilitate implementation of the Convention on Biological Diversity, the Ramsar Convention and the Bonn Convention
	Law on Protected Natural Territories (03.12.2004 No. 711-II)	Provisions for protection and use of protected territories, preservation of natural objects and complexes, prevention of negative impacts from human activities, completion of environmental monitoring, environmental education and personal development.
	Law on Environment Control (27.12.2013, No. 363)	Defines requirements for businesses to comply with legal requirements on environmental control, rational use of resources, environmental monitoring and identification of environmental violations
	Law on subsoil, dated 23/9/1994 (New edition, approved on 13/12/2002 No 444-II) last amendment was made on 30.04.13 (№ ZRU 352)	Requirements for environmental management and licensing covering ecological studies, waste management, waste disposal procedures and liability.
	Decree of the President of the Republic of Uzbekistan "On improving state management development in scope of ecology and environmental protection" dated April 21, 2017 No. УП-5024	The decree states that the State Committee on Ecology and protection of environment will be accountable to the Cabinet of Ministers. The committee will ensure ecological improvements of the environment, the protection of ecological systems, natural complexes and individual species.
	PP-2915 "Measures to ensure organization of activities of State Committee of the Republic of Uzbekistan on Ecology and Environmental Protection"	The measures put in place involved the reorganisation of the Centre of specialised analytical control in the field of environmental protection under the State committee of the Republic of Uzbekistan on ecology and environmental protection. Aims at providing effective organisation of activities on ecology and environmental protection in Uzbekistan.
Energy	Law on the Rational Use of Energy (Law No. ZRU-401 last amended 20.01.16)	Aims at reducing energy use through energy use standards and indicators, energy efficiency inspections and promotion of energy efficient products.
Waste Management	Law on Waste (No. 362-II of 05.04.2002) last amended 2011	This law enacts the SCEEP with administrative functions (coordination, inspection, ecological expertise, and regional monitoring parameters

Area	Law / Regulation	Summary
		for waste processing). It also includes provision of basic human rights, ensuring the citizens of Uzbekistan have the right to a safe and healthy environment, to participate in the discussion of projects, and to compensation as a result of damages suffered as a result of a development or project. The Act also covers waste transport and the prohibition of storage / burial of radioactive waste.
Land Use	Land Code (1998) 30/4/1998 No 598-I; last amendment was made on 04.09.2014 (№ZRU 373)	Outlines requirements for categorisation of land and procedures for land acquisition and termination of use.
	Law on Forests (No. 770-I of 15.04.1992) amended 30.04.2013, Ref. 372.	Defines regulation of forestry with regard to securing, protecting, rational use, reproduction and increasing productivity of the forests, as well as protection of the rights of legal entities and individuals.
Water Management	Law on Water and Water Usage dated 6/5/1993 No 837-XII last amendment was made on 04.09.2014 (№ZRU 373)	Establishes the rational use of water for population needs and relevant branches of the economy. Includes provisions for protection against contamination, supply and depletion, and against adverse impacts. It also provides protection of the rights and legal interests of the legal entities and individuals.
Atmospheric Emissions	Law on Protection of the Atmosphere dated 27/12/1996 No 353-I last amendment was made on 30.04.2013 (№ ZRU 352)	Includes provision for the preservation of ambient atmospheric air, prevention and mitigation of adverse chemical, physical, biological impacts on atmospheric air. Defines legal regulation of the activities of the government, enterprises, institutions, organizations, non-governmental organisations (NGOs) and citizens in the area in protection of atmospheric air
	Law on the Ratification of Amendments to the Montreal Protocol on Substances that Deplete the Ozone Layer (Beijing 03.12.1999 (No. 44, of 07.09.2006)	Facilitates implementation of the Amendments to the Montreal Protocol on Substances that Deplete the Ozone Layer in defence of the ozone layer ,by phasing-out of some chemical substances which deplete the ozone layer
	Law on the Ratification of Amendments to the Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal 17.09.1997 (No. 45, of 07.09.2006)	Facilitates implementation of the Amendments to the Montreal Protocol on Substances that Deplete the Ozone Layer in defence of the ozone layer by phasing-out of some chemical substances which deplete the ozone layer

Area	Law / Regulation	Summary
Ecology	Law on the Protection of Agricultural Plants Against Pests, Diseases and Weeds (No. 116-II of 31.08.2000)	Includes provisions for the protection of agricultural plants against pests, diseases and weeds, as well as prevention of the adverse impact of plant protection agents on the human health and environment.
	Law on State Ecological Expertise (No. 73-II of 25.05.2000, last amended in 2011)	Specifies the processes to of compliance for ecological compliance of an activty or development. Defines the procedure for assessment of level of ecological hazard of an activity, which may impact the environment and / or health of people. Provides detail on environmental protection measure and efficient use of natural resources
	Law on protection and use of flora a revised edition on 21.09.2016. No. 409.	Provides regulation on the use of flora growing under natural conditions, and wild plants contained under conditions of crop, to ensure reproduction and preservation of their genetical stock.
	Law on protection and use of fauna, a revised edition dated 21.09.2016 No 408.	Ensures the protection on the use of wild animals living in the wild overland, in water, air and in soil, permanently or temporarily inhabiting the territory of the Republic of Uzbekistan, as well as kept under semi-free conditions or artificially created habitat for scientific or nature protection purposes
	Law on ratification of the Paris Agreement of 02.10.2018 No. ZRU-491	In order to ensure the fulfillment of the Paris Agreement obligations in the country, the Strategy for the transition of the Republic of Uzbekistan to a “green” economy for the period 2019-2030 (approved by RUz President Decree of 04.10.2019 No. PP-4477ОБ) has been developed.
Environmental Mapping	Law on Geodesy and Cartography (No. 417-I of 25.04.1997, last amended in 2011)	Establishes the legal basis geodesy and cartography activities in the Republic of Uzbekistan. Defines the conditions for meeting the requirements of public, legal entities and individuals regarding geodetic and cartographic products.

Table 4 – Summary of Applicable Resolutions for Enactment of Environmental Law

Area	Resolution	Summary
General Environmental Protection	Cabinet of Ministers Resolution (2003) on the Improvement of the System of Payments for Environmental Pollution and Waste Disposal	Enactment of Law on Nature Protection. Provided legislation of amounts required to be paid for environmental pollution and wastes
	Cabinet of Ministers Resolution (2005) on the Procedure of Application of the Compensation Payments for Environmental Pollution and Waste Disposal is applicable to the handling of mining wastes	Enactment of Law on Nature Protection.
	Cabinet of Ministers Resolution (2006) on the Improvement of the System of Payments for Special Nature Use.	Enactment of Law on Nature Protection. Amendment to previous regulation on the responsibilities of the SCEEP covering compensation payments for environmental pollution.
	Cabinet of Ministers Resolution (2010) on Measures to Adjust Payments to Non-Budget Funds of the Ministries and Other Government Agencies.	Enactment of Law on Nature Protection. Legal platform for adjustments to compensation payment rates.
	Cabinet of Ministers Resolution (2003) on the Procedure for Application of Compensation for Pollution of Environment and Waste Placement on the Territory of the Republic of Uzbekistan.	Provision for compensation costs, emergency releases, pollutant emissions and waste disposal.
Environmental Impact Assessment	Cabinet of Ministers resolution (21.01.2014, No. 14) on the Procedure for Development and Approval of Environmental Project Standards.	Provision to ensure projects consider environmental impact on the environment (covering emissions, waste, pollution sources) considering environmental quality standards. Requirement for submission of Environmental Impact Assessment for approval by the SCEEP. Assessment of projects is required include an inventory of sources of emissions, discharges, generation, waste disposal and associated control measures.
	Decree of the RUz Cabinet of Ministers "On Further Improvement of the Mechanism for environmental impact assessment" of 07.09.2020 No. 541.	The Decree approved: - The list of activities related to I (high risk), II (average risk), III (lower risk), as well as to the IV (local level) categories of environmental impact, and the list of

Area	Resolution	Summary
		activities that are subject to state environmental expertise; - The Regulation on the procedure for conducting an expertise of activities related to I, II, III and IV categories. It includes: the procedure for preparing materials, the terms, the rights and obligations of the participants in the expertise, the status of the conclusion, as well as the time of payment; - The Regulation on the procedure for conducting mandatory public discussions and hearings of projects for assessing environmental impact on the planned types of activities related to the I and II categories of environmental impact before a state environmental expertise.
Subsurface	Cabinet of Ministers resolution (12.05.2014, No. 119) on the Procedure for Monitoring of Subsurface.	Defines procedures for subsoil users and field development plans, to ensure completion on monitoring.
Water Resource Management	Cabinet of Ministers resolution (19.03.2013 No. 82) on the Adoption of Regulation on the Arrangements Regarding Water Use and Consumption in the Republic of Uzbekistan.	Provision for arrangements regarding water use, consumption, water intake limits, monitoring and violation of water use.
	Decision of the Cabinet of Ministers of the Republic of Uzbekistan "On approval of Regulations for issuing permits for special water use or water consumption" dated June 14, 2013, No. 171	Provision for arrangements regarding permitting for special water use and consumption.
Environmental Monitoring	Cabinet of Ministers resolution (23.08.2016 No. 273) on the Approval of the State Environment Monitoring Program in the Republic of Uzbekistan for 2016-2020.	Defines the procedure for maintenance of the state environmental monitoring.
Waste	Cabinet of Ministers resolution (27.10.2014, No.295) on the Procedure of State Registration and Control in the Sphere of Waste Management.	Regulates activities related to generation, collection, storage, transportation of waste, recycling and waste disposal. Ensure waste management records and procedures are maintained and annual reports produced.

Area	Resolution	Summary
	Cabinet of Ministers resolution (15.07.2014, No. 194) on Regulations for the Provision of Services for Collection and Disposal of Solid and Liquid Waste.	Provision of services relating to the collection and treatment of waste.

Table 5 – Regulatory Acts Subordinate to Environmental Laws

Area	Regulatory Acts	Summary
General Environmental Protection	Regulation On the State Committee of the Republic of Uzbekistan for the Nature Protection" (adopted by a Decree of the Oliy Majlis No 232-I dated 26/4/96) last amendment was made on 04.09.14 (№ZRU 373)	Defines the key tasks, functions, rights and responsibility of the State Committee of the Republic of Uzbekistan for the Nature Protection.
	Paragraph 11 of the Regulation on the State environmental review in the Republic of Uzbekistan (Annex No 1 to the Decree of the Cabinet of Ministers On approval of the Regulation on the State environmental review in the Republic of Uzbekistan" 491 dated 31/12/2001) – effective. Last amendment was made on 01/11/2012 (Decree of the Cabinet of Ministers No 313);	Stipulates the types of the ecological examination, procedures and participants of the examination, amounts of payment for the State environmental expertise.
	Resolution of the Cabinet of Ministers of Uzbekistan. from 23.05.2017 for the number 310 "On approving the Regulations on the State Committee of the Republic of Uzbekistan on Ecology and Environmental Protection".	
Subsurface	Decree of the Cabinet of Ministers dated 08/06/2011 No.165 On approval of the Regulation on the State Committee of the Republic of Uzbekistan for Geology and Mineral Resources, as amended by the Decree of the Cabinet of Ministers dated 02/11/2011 No.294	Defines the key tasks, functions, rights and responsibility of the State Committee of the Republic of Uzbekistan for Geology and Mineral Resources.
	Regulation On state supervision over geological study, the use and	Defines the key tasks, functions, rights and responsibility of the authorities in charge of the

Area	Regulatory Acts	Summary
	protection of subsoil" (Annex 1 to the Decree of the Cabinet of Ministers dated 28/07/2011 No.220)	state control for geological survey, the use and protection of subsoil, and confirms the procedure for exercising state supervision in this matter.
	Decree of the Cabinet of Ministers dated 11/05/2011 No.131 On Measures for Further Improvement of the Structure of the State Inspection Service for Supervising Geological Study of Subsoil, Safety Operation in Industry, Mining and Municipal-Domestic Sectors under the Cabinet of Ministers of the Republic of Uzbekistan. Last amendment was made on 01/11/2012 (Decree of the Cabinet of Ministers No.313);	Defines the key tasks, functions, rights and responsibilities of the State Inspection Service for Supervising Geological Study of Subsoil, Safety Operation in Industry, Mining and Municipal-Domestic Sectors.
Water Resource Management	Decree of the Cabinet of Ministers dated 28/6/2003 No 290 On improving the organization of activity of the Ministry of Agriculture and Water; and the Decree of the Cabinet of Ministers dated 21/07/2003 No.320 On Improving Water Resources Management"	Defines the key tasks, functions, rights and responsibility of the Ministry of Agriculture and Water.
Air Emissions	SanPiN 0293-11 dated 16/05/2011 Hygienic regulations. List of maximum permissible concentrations (MPC) of contaminants in the atmospheric air of inhabitant areas in the territory of the Republic of Uzbekistan	Defines the substance hazard category and establishes the MPC of contaminants in the atmospheric air of inhabitant areas.
	SanPiN 0294-11 dated 18.05. 2011. List of maximum allowable concentrations (MAC) of pollutants in air of working area.	Defines the substance hazard category and establishes the MAC of pollutants in the atmospheric air of working areas.
Waste	SanPiN of the Republic of Uzbekistan dated 12/7/2004 0157-04 Sanitary requirements to the storage and neutralization of solid domestic waste on special grounds in Uzbekistan	Specifies the rate of accumulation of household solid wastes, hygienic requirements to municipal solid waste landfill and requirements for admission of wastes.
	SanPiN of the Republic of Uzbekistan dated 29/7/2002 No 0127-02 – Sanitary rules for inventory making, classification,	Defines the classes of industrial wastes, and the requirements for storage and rendering harmless.

Area	Regulatory Acts	Summary
	storing and rendering harmless of industrial wastes	
	SanPiN of the Republic of Uzbekistan dated 29/7/2002 No 0128-02 – Hygienic classifier of toxic industrial wastes in the Republic of Uzbekistan" –	Supplements SanPiN of the Republic of Uzbekistan "Sanitary rules or inventory, classification, storing and decontamination of industrial waste", intended for improvement of accounting and reports on industrial toxic industrial waste. Provides identification of methods of recycling, processing or disposal. Confirms procedure for calculation of damage from contamination in the environment from toxic waste.
	SanPiN of the Republic of Uzbekistan dated 16/11/2011 No 0300-11 Sanitary Rules and Standards for managing collection, inventory, classification, treatment, storage and disposal of industrial waste in the context of Uzbekistan	Defines the basic standards and rules for the process of collection, inventory, classification, treatment, storage and disposal of industrial waste, and also processing and waste landfilling.
	Regulation "On the Procedure for the Disposal, Collection, Pay Settlement, Storage and Removal of Waste Industrial Oils annexed to the Decree of the Cabinet of Ministers dated 04/09/2012 No.258;	Defines the process of collection and storage of waste industrial oils, the general responsibilities of bodies who are involved in the process of removal, collection and storage of Waste Industrial Oils, and describes the procedure for payments.

4.3.3 National Socio-economic Legislation

The following tables provide a summary of the legislative framework relating to socioeconomic aspects in Uzbekistan:

Table 6 – Summary of Relevant Social Legislation

Area	Law / Regulation	Summary
Employment	Labour Code of 01.04.1996 last amendment was made on 20.08.15 (No. 391)	Main statute, defining and regulating employer-employee relationship.
	Law on Labour Protection of 06.05.1993 No.839-XII.	The purpose of this Law is regulation of the relations in the field of labour protection. This Law establishes a unified procedure for organizing labour protection, regardless of the methods of production, forms of ownership, and

Area	Law / Regulation	Summary
		is aimed at ensuring the protection of the health and labour of citizens.
Women's Rights	Family Code of 01.09.1998 last amendment was made on 23.09.16 (No. 411)	Basic codified regulatory legal act, which regulates marital relations in Uzbekistan
	Law on Protection of Women from Harassment and Violence of 02.09.2019 No. 561.	The purpose of the Law is to regulate relations in the field of protecting women from all forms of oppression and violence.
Social Protection and Welfare	Law No.422-XII on Social Protection of Disabled Persons in the Republic of Uzbekistan of 18.11.1991 (as amended on 11.07.2008) Law on Rights of Persons with Disabilities of 15.10.2020 No. ZRU-641.	Defines the state policy in respect of invalids to ensure they are provided with equal opportunities with other citizens in employment of rights and freedom, removal of restrictions in their life activity, creation of favourable conditions, to allow the leading of a full active life, active participating in the economic and political life of the society, as well as executing of their civil obligations.
	Law No.938-XII on State Pensions of 03.09.1993 (as amended on 22.12.2010)	Defines the procedure for exercise of constitutional rights of citizens of the Republic of Uzbekistan for social security in old age, in case of full or partial disability, loss of bread-winner, establishes the uniform system of state pensions, procedure for assignment of the same, calculation, recalculation and payment.
	Law No.616-I on Employment of 01.05.1998 (as amended on 20/01/2014 (No. 365)	Determines the rights of citizens in providing employment, adjusting employment and describes the social guarantees provided following the loss of work.
	The Decree of the President on Measures for Further Improvement of the System of Social Support and Medical-Social Assistance to Vulnerable Population (22.02.2016, No. 4782)	Provision of medical and social assistance to vulnerable groups (including the elderly, disabled, children, war veterans), vocational training, management of health provision and payment of social benefits.
	Law No. 376 on Social Partnership of 25.09.2016	Confirms rights and duties on social partnerships
	Law on Employment of the population of 20.10.2020 No.ZRU-642.	Determines the rights of citizens in providing employment, adjusting employment and describes the social guarantees provided following the loss of work. The Law regulates the main directions of state policy in the field of

Area	Law / Regulation	Summary
		employment, powers of the Cabinet of Ministers of the RUz in the field of employment, powers for external labour migration, powers of territorial and local labour bodies in the field of employment, etc.
	Law on guarantees of the Rights of the Child of 07.01.2008 No. ZRU-139.	The purpose of this Law is regulation of the relations in the field of guarantees of the rights of the child.
Human Rights	1992 Constitution of the Republic of Uzbekistan (No. 723-XII of 08.12.1992) as amended on 16/04/2014	Determines fundamental political, judicial and economical system of the Republic of Uzbekistan.
	Resolution of Oliy Majlis of Uzbekistan on Approval of the Declaration on the Elimination of All Forms of Intolerance and of Discrimination Based on Religion or Belief No.505-I of 30.08.1997	Document details the right to freedom based on the religion or persuasions of any family.
	Resolution of Oliy Majlis of Uzbekistan on ratification of the Convention Concerning Discrimination in Respect of Employment and Occupation No.499-I of 30.08.1997	The document provides policy details on equality of possibilities in respect of labour and occupations for the purpose of eradication of any discrimination.
	The state adopted the National Human Rights Strategy on June 22, 2020.	This became the first strategic document in the history of Uzbekistan to define a set of long-term targeted measures to ensure personal, political, economic, social, and cultural human rights.
	Latest human rights related Presidential Resolutions:	No.PP-5163 “On Additional Measures to Improve the System for the Detection and Prevention of Torture Cases”, 2021
		No.UP-6312 “On measures to Improve Activities of the Commissioner for Human Rights Ombudsman) of the Oliy Majlis of the Republic of Uzbekistan”, 2021
Land Allocation and Use	Civil Code of the Republic of Uzbekistan of 01.03.1997 (last amendment 25.04.2016 Law No. 405)	Systematic regulatory act, containing civil standards.

Area	Law / Regulation	Summary
	Land Code (1998) 30/4/1998 No 598-I; last amendment was made on 04.09.14 (No. 373)	This provides detail on the form of systematization of the land laws. It establishes the types of ownership on land, defines the competence of administrative bodies in the field of withdrawal and provisions of land plots, right for use of the same, and the rights of land owners, principles of maintenance of land cadastre, settlement of land disputes etc.
	Law No.600-I on Shirkat (Cooperative) Farm of 30.04.1998 (as amended on 25.12.2009);	Defines the legal basis of creation, activity, reorganization and liquidation of agricultural cooperatives (shirkat), regulates their rights and obligation, and confirms relationship requirements with other legal entities and physical persons.
	Law No.602-I on Private Farm of 30.04.1998 as amended on 10.09.12 (No. 329)	Stipulates the regulation of relations associated with creation, activity, reorganization and liquidation of farms.
	Law No.604-I on Dehkan (Individual) Farm of 30.04.1998 as amended on 20.08.15 (No. 391)	Defines the legal basis of creation, activity and liquidation of dehkan farm, regulates their rights and duties, and regulates mutual relations with other entities and persons
	Law on State Land Cadastre No.666-I of 28.08.1998 (last amended 04.01.2011, Law No. 278)	Establishes the legal basis of maintenance of the state land register, use of cadastre data for development of the economy, ensuring of guarantees of rights on land plots, efficient use, resoration and protection of lands.
	Law on State Cadastre (No. 171-II of 15.02.2000, last amended in 2011)	Confirms provision in the conduct of state cadastres, collection and use of cadastre information.
	Housing Code of the Republic of Uzbekistan of 24.12.1998 as amended on 20.01.14 No. 365)	Provides detail on residential and non-residential premises, usage, and determines housing rights of citizens.
	Urban Code of the Republic of Uzbekistan of 04.04.2002 (as amended on 04.01.2011)	Provides provisions dealing with town-planning.
Cultural Heritage	Law on the Protection and Use of Objects of Cultural Heritage (No.	Covers preservation and management of important elements of the built environment, protection of territories representing historical archaeological, aesthetic, ethnological or

Area	Law / Regulation	Summary
	269-II of 30.08.2001) last amended in 2009	anthropological value, and protection of natural landscapes connected with historical events and persons
	Law on the Export and Import of Cultural Values (No. 678 of 29.08.1998) amended 04.09.2014.	Defines regulations associated with preservation of the cultural heritage of Uzbekistan's people, protection of cultural values against illegal exportation and importation of the same, establishment of the uniform procedure for exportation from the RUz and importation into the RUz of cultural values, as well as promotion of development of international cultural cooperation.
Stakeholder Engagement	Town Planning Code (No. 353-II of 04.04.2002) last amended 2011	Provisions for stakeholder consultation, environmental management and access to information. Confirms the public have the right to comprehensive and timely information on environmental conditions and future plans that could have a potential adverse impact on the environment. Citizens also have the right to take part in discussions on town planning processes.
	Urban Code of the Republic of Uzbekistan of 22.02.2021 No. ZRU-676.	Provisions for stakeholder consultation, environmental management and access to information. Confirms the public have the right to comprehensive and timely information on environmental conditions and future plans that could have a potential adverse impact on the environment. Citizens also have the right to take part in discussions on town planning processes.
Emergency Planning	Law on the State Programme for Forecasting and Preventing Emergency Situations (No.71 of 03.04.2007)	Provision for the preparation and monitoring of conditions concerning potential technological and natural emergency situations
	Law on Protection of the population and territories from natural and man-made emergencies of 20.08.1999 No 824-I.	Regulation of public relations in the field of protection of the population and territories from natural and man-made emergencies. The purpose of the law is to prevent the occurrence and development of emergency situations, reduce losses from emergency situations and eliminate emergency situations.
	Constitutional Law on State of Emergency of 15.12.2021 No. 737.	The law defines the conditions and procedure for introducing a state of emergency throughout the territory or in certain areas of the RUz.
Freedom of Information	Law on the Principles and Guarantees of Freedom of	Limitations on the access to information where it protects the rights and freedom of individuals,

Area	Law / Regulation	Summary
	Information (No. 439-II of 12.12.2002)	their moral values, and spiritual, cultural and scientific potential.
Government & Administration	Law on Self Government Institutions of Citizens	Regulation of citizens' self-government institutions, covering democracy, transparency, publicity, social justice, public recourse, social partnerships and consideration of local customs and traditions.
	Law on International Treaties (No. 172-I of 22.12.1995, last amended in 25.04.2016, Ref. 405 and 06.02.2019 No. ZRU-518)	Establish a procedure for submission, execution, dissolution, abeyance and denunciation of international treaties of the RUzz.
Training & Education	Law on the National Personnel Training Programme (No. 463-I of 29.08.1992) amended 07.10.2013, No. 355.	Approves the "National program on staff training", and provides details on the plan of action for phased implementation of the national program of staff training, and details on the financial and material security elements for approval by the state budget.
	Law on Education (No. 464-I of 29.08.1997, last amended in *23.09.2020 No.ZRU-637*)	Defines the legal basis for training, upbringing, and professional development of citizens and is aimed at ensuring of the constitutional right of everybody for education.

4.3.1 National Health and Safety Legislation

Tables 7 and 8 below detail National Legislation pertaining to health and safety aspects in Uzbekistan.

Table 7 – Summary of Laws with Provisions for Health and Safety

Area	Law / Regulation	Summary
Occupational Health and Safety	Law No. 393 Code on ensuring the Sanitary and Epidemiological Welfare of the Population dated 26.08.2015	Provision of sanitary and epidemiological welfare for the population and anti-epidemic measures
	Law No. 410 on Occupational Health and Safety 22/09/2016	Defines regulation associated with labour protection, improvement of conditions of labour protection and terms of labour, and maintenance of health of workers

Area	Law / Regulation	Summary
	Law No.265-I on Protecting Health of Citizens 29.08.1996 (as amended on 19.05.2010)	Defines citizens' rights on protection of health on the part of the state; formation of healthy mode of life of citizens and legal regulation of the activity of state bodies, institutions, organizations, public associations in the field of citizens' health protection.
	Law No.57 on Occupational Safety at Hazardous Industrial Facilities of 25.08.2006 last amendment was made on 04.09.14 (No. 373)	Defines regulation associated with industrial safety of hazardous industrial facilities.
	Law No. 174 on Mandatory State Social Insurance against Occupational Accidents and Diseases of 10.09.2008 last amendment was made on 30.04.13 (No. 252)	Defines the implementation of social protection for citizens by means mandatory social insurance against accidents and occupational diseases. Ensures insurance compensation is in place damage to life and / or health of an employee as a result of an occupational accident or occupational disease.
Community Health & Safety	Law No. 378 on the Appeal of individuals and legal entities 03/12/2014	Defines regulations associated with appeal of individuals and legal entities to state bodies and government agencies.
	Law No. 353 on the Interdiction of the Disease Caused by Human Immunodeficiency Virus (HIV)of 23/09/2013	Defines regulations associated with counteraction to distribution of the disease caused HIV.
	Law No.123-II on Psychiatric Services of 31.08.2000	Provides regulation on psychiatric help to the population.
	Law No.215-II on Protecting the Population against Tuberculosis of 11.05.2001	Establishes the legal basis of execution of social, medical, sanitary-hygienic, anti-epidemic and other activities aimed at prevention of tuberculosis disease, as well as revelation, treatment, dispensary observation and rehabilitation of tuberculosis patients.
	Law No.402-II on Donation of Blood and its Components of 30.08.2002 last amendment was made on 25.04.16 (No. 405)	Provides regulations in the field of donation of blood and its components. The main principles of donation of blood and its components shall be the voluntary giving of blood donations, and to ensure the safe use of donor blood and its components.

Area	Law / Regulation	Summary
	Law No. 97 on Preventing Iodine Deficiency Disorders of 30.08.2007	Defines regulations associated with Preventing Iodine Deficiency Disorders
Health and Safety of Specific Relevant Industries	Law on the Safety of Waterworks (No. 826-I of 20.08.1999)	Provides safety regulations for the engineering, construction, commissioning, operation, reconstruction, reduction, conservation and liquidation stages of waterworks
Health and Safety Provisions included in Environmental / Socioeconomic regulation	Law on water and water use dated 6/5/1993 No 837-XII last amendment was made on 04.09.14 (No. 373)*	Establishes the rational use of water for population needs and relevant branches of the economy. Includes provisions for protection against contamination, supply and depletion, and against adverse impacts. It also provides protection of the rights and legal interests of the legal entities and individuals.
	Law on Nature Protection (9/12/1992 No 754-XII) last amended 04.09.2014 (No. 373)*	Basic environmental law.
	Law on protection of the atmosphere" dated 27/12/1996 No 353-I last amendment was made on 30.04.13 (No. 352)*	Includes provision for the preservation of ambient atmospheric air, prevention and mitigation of adverse chemical, physical, biological impacts on atmospheric air. Defines legal regulation of the activities of the government, enterprises, institutions, organizations, NGOs and citizens in the area in protection of atmospheric air
	Law on subsoil" dated 23/9/1994 (New edition, approved on 13/12/2002 No 444-II) last amendment was made on 30.04.13 (No. 352)*	Requirements for environmental management and licensing covering ecological studies, waste management, waste disposal procedures and liability. Health and Safety elements include the safe operation during subsoil use, and protection of personal interests.
	"Land Code" dated 30/4/1998 No 598-I; last amendment was made on 04.09.14 (No. 373)*	Outlines requirements for categorisation of land and procedures for land acquisition and termination of use. – Health and Safety element: securing, protecting, rational use, reproduction of land, protection of personal interests and basis of vital functions of citizens.

Table 8 – Nominative Acts Subordinate to Laws and Resolutions with Health and Safety Provision

Area	Law / Regulation	Summary
Safety Supervision	Decree of the Cabinet of Ministers dated 11/05/2011 No.131 On Measures for Further Improvement of the Structure of the State Inspection Service for Supervising Geological Study of Subsoil, Safety Operation in Industry, Mining and Municipal-Domestic Sectors under the Cabinet of Ministers of the Republic of Uzbekistan. Last amendment was made on 01/11/2012 (Decree of the Cabinet of Ministers No.313).	Defines the key tasks, functions, rights and responsibilities of the State Inspection Service for Supervising Geological Study of Subsoil, Safety Operation in Industry, Mining and Municipal-Domestic Sectors.
Emissions	SanPiN No. 0293-11 dated 16/05/2011. Hygienic regulations. List of MPC of contaminants in the atmospheric air of inhabitant areas in the territory of the Republic of Uzbekistan.*	Defines the substance hazard category and establishes MPC of contaminants in the atmospheric air of inhabitant areas.*
Waste	SanPiN of the Republic of Uzbekistan dated 12/7/2004 0157-04 Sanitary requirements to the storage and neutralization of solid domestic waste on special grounds in Uzbekistan.*	Specifies the rate of accumulation of household solid wastes, hygienic requirements to municipal solid waste landfill and requirements for admission of wastes.*
	SanPiN of the Republic of Uzbekistan dated 29/7/2002 No 0127-02 – Sanitary rules for inventory making, classification, storing and rendering harmless of industrial wastes. *	Defines the types and class of industrial waste, and requirements for storage and rendering harmless.*
	SanPiN of the Republic of Uzbekistan dated 29/7/2002 No 0128-02 – Hygienic classifier of toxic industrial wastes in the Republic of Uzbekistan.*	Supplements SanPiN of the RUz Sanitary rules or inventory, classification, storing and decontamination of industrial waste", intended for improvement of accounting and reports on industrial toxic industrial waste, identification of methods of recycling of the same, processing or disposal in the environment, may be used for calculation of damage from contamination of the environment with toxic waste.*

Area	Law / Regulation	Summary
	SanPiN of the Republic of Uzbekistan dated 16/11/2011 No 0300-11 Sanitary Rules and Standards for managing collection, inventory, classification, treatment, storage and disposal of industrial waste in the context of Uzbekistan.*	Defines the basic standards and rules for the process of collection, inventory, classification, treatment, storage and disposal of industrial waste, an also processing and waste landfilling.*
Occupational Health and Safety	Cabinet of Ministers resolution (15.09.2014, No. 263) on the Procedure for Conducting Assessment of Workplaces with Respect to Working Conditions and Equipment Injury Risk.	Procedures for the completion of workplace assessments covering working conditions, labour process, injury risk, medical examinations for women and certifying authorities.

**Previously defined under legislation relating to environmental protection and socioeconomic aspects (refer to tables above).*

4.4 Environmental & Social Administration & Regulators in Uzbekistan

4.4.1 Key Administrators and Regulators

4.4.1.1. State Committee of the Republic Uzbekistan on Ecology and Environmental Protection

The principal environmental body for environmental protection in RUz is the SCEEP or Goskompriroda, who report to the Cabinet of Ministers of the Republic of Uzbekistan. Their principal responsibilities include:

- Integrated environmental management and conservation activities;
- Overseeing and coordination of various industrial / developmental / mining activities to promote favorable environmental conditions and appropriate rehabilitation of the environment;
- Enforcing and promoting state policy on environmental security, conservation, natural resources use; and
- Conservation inspections and environmental audits (Golders, 2014).

4.4.1.2. Ministry of Labour and Social Welfare of the Republic of Uzbekistan

The Ministry of Labour and Social Welfare of the Republic of Uzbekistan (MLSW) is the principal regulator for social-economic aspects covering labour-related issues, employment, pension benefits, social welfare and migration issues. The MLSW reports to the Cabinet of Ministers of the Republic of

Uzbekistan. The MLSW mandate is outlined within the Regulations on the Ministry of Labour and Social Welfare enacted by the Cabinet of Ministers in 2007 (Golders, 2014).

4.4.2 Other Relevant Administration and Regulatory Bodies

Other key bodies and regulators with responsibilities for environment protection and social aspects include:

- Ministry of Agriculture and Water Resources (MAWR) – oversees regulations on water and agriculture, developments in regional water and resources management, and the development of agricultural markets;
- State Committee for Land Resources, Surveys, Cartography and the State Cadastre (or Goskomgeodezkadastr) – provides policy information on sustainable landuse, land administration, efficient use of land resources; supports state geodetic networks; creates and publishes topographic mapping; and co-ordinates state and regional agencies in implementation of state cadastres;
- State Committee for Geology and Mineral Resources (or Goskom geologia) – supports work relating to subsoil, hydromineral resources, industrial minerals, ferrous and rare metals, rare earth elements, and the expansion of the mineral resources base;
- Centre of Hydro-meteorological Service (or Uzhydromet) – responsible for hydrometeorological and agrometeorological observations, scientific research activities, improvement of short-term and long-term weather forecasts, water availability of rivers and climate change initiatives;
- Ministry of Health (or MHRUz) - responsible for State management of health care, implementation of the national health policy, and ensuring health improvements and the promotion of healthy life styles;
- State Inspectorate for Exploration Supervision, Operations Safety Supervision of Industry, Mining and Utilities Sector (or Sanoatgeokontekhnazorat);
- Ministry of Internal Affairs (or MVD) - body of the Government of Uzbekistan that is charged with the internal affairs of Uzbekistan and oversees the national police;
- Regional (Oblast), municipal and local governments;
- Trade Union Federation Council – trade union centre in Uzbekistan.

4.5 International Treaties and Conventions

Uzbekistan has ratified the following international treaties and conventions pertinent to the project as defined in Table 9.

Table 9 – International Conventions Applicable to Environmental and Socioeconomic Aspects, Ratified by Uzbekistan

Area	Convention	Date Ratified by Republic of Uzbekistan
General Environmental	Agreement on co-operation in the field of Environment protection	1992
	Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques	1993
	United Nations Convention to Combat Desertification	1995
Ecology	Convention on Migratory Species of Wild Animals	1998
	Convention on International Trade of Endangers Species of Wild Flora and Fauna (CITES)	1997
	UN (Rio) Convention on Biological Diversity	1995
	Ramsar Convention on Wetlands of International Importance Especially as Wildlife Habitat	2002
	Agreement on the Conservation of African-Eurasian Migratory Waterbirds	2003
	International convention on the protection of new varieties of plants	2004
Air Emissions & Climate Change	UN Framework Convention on Climate Change	1993
	Vienna Convention on the Protection of Ozone Layer	1993
	Montreal Protocol on Substances that Deplete the Ozone Layer (with London, Copenhagen, Montreal amendments)	1993
	Kyoto Protocol to UN Framework Convention on Climate Change	1999
	In April 2017 Uzbekistan joined the Paris Agreement on Climate Change	2017
	Uzbekistan joined the Global Methane Pledge (GMP) in end of May 2022	2022
Cultural Heritage	Paris Convention on Protection of the World Cultural and Natural Heritage	1995
Waste	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	1995
	Convention on the Control of Transboundary Movements of Hazardous Wastes	1997

Area	Convention	Date Ratified by Republic of Uzbekistan
	Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2008
Woman's Rights	Convention on the Elimination of All Forms of Discrimination against Women (1979)	1995
Human Rights	Convention on the Elimination of All Forms of Intolerance and of Discrimination Based on Religion or Belief (1981)	1997
	Universal Declaration of Human Right (1948)	1991
	International Covenant on Civil and Political Rights (1966)	1995
	CAT – Convention against Torture and Other Cruel Inhuman or Degrading Treatment or Punishment, ratified on 28 Sep. 1995;	1995
Labour	International Labour Organisation Conventions Ratifications status (19 Conventions and 1 Protocol) - Fundamental Conventions: 9 of 10 - Governance Conventions (Priority): 4 of 4 - Technical Conventions: 6 of 176	

4.5.1 International Labour Organization Conventions Ratification detailed status of August 2022

4.5.1.1. FUNDAMENTAL

Convention	Date	Status	Note
C029 - Forced Labour Convention, 1930 (No. 29)P029 - Protocol of 2014 to the Forced Labour Convention, 1930 ratified on 16 Sep 2019 (In Force)	13 Jul 1992	In Force	
C087 - Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87)	12 Dec 2016	In Force	
C098 - Right to Organise and Collective Bargaining Convention, 1949 (No. 98)	13 Jul 1992	In Force	
C100 - Equal Remuneration Convention, 1951 (No. 100)	13 Jul 1992	In Force	
C105 - Abolition of Forced Labour Convention, 1957 (No. 105)	15 Dec 1997	In Force	
C111 - Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	13 Jul 1992	In Force	
C138 - Minimum Age Convention, 1973 (No. 138)Minimum age specified: 15 years	06 Mar 2009	In Force	

C182 - Worst Forms of Child Labour Convention, 1999 (No. 182)	24 Jun 2008	In Force	
C187 - Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187)	14 Sep 2021	Not in force	The Convention will enter into force for Uzbekistan on 14 Sep 2022.

4.5.1.2. GOVERNANCE (PRIORITY)

Convention	Date	Status	Note
C081 - Labour Inspection Convention, 1947 (No. 81)	19 Nov 2019	In Force	
C122 - Employment Policy Convention, 1964 (No. 122)	13 Jul 1992	In Force	
C129 - Labour Inspection (Agriculture) Convention, 1969 (No. 129)	19 Nov 2019	In Force	
C144 - Tripartite Consultation (International Labour Standards) Convention, 1976 (No. 144)	13 Aug 2019	In Force	

4.5.1.3. TECHNICAL

Convention	Date	Status	Note
C047 - Forty-Hour Week Convention, 1935 (No. 47)	13 Jul 1992	In Force	
C052 - Holidays with Pay Convention, 1936 (No. 52)	13 Jul 1992	In Force	
C103 - Maternity Protection Convention (Revised), 1952 (No. 103)	13 Jul 1992	In Force	
C135 - Workers' Representatives Convention, 1971 (No. 135)	15 Dec 1997	In Force	
C154 - Collective Bargaining Convention, 1981 (No. 154)	15 Dec 1997	In Force	
C167 - Safety and Health in Construction Convention, 1988 (No. 167)	09 Jun 2022	Not in force	The Convention will enter into force for Uzbekistan on 09 Jun 2023.

4.6 National EIA Requirements

Under the regulatory framework for the RUz, the SCEEP ('Goskompriroda') is the principal environmental regulator for the enforcement of environmental compliance, and for defining and enforcing environmental and conservation policy. The SCEEP assesses all development projects according to potential risk of environmental impact, assigning a category which determines the subsequent level of environmental assessment required by the applicant. Four categories are assigned as defined below:

- Categories I and II: high and medium risk of environmental impact;
- Category III: low risk of impact;
- Category IV: low impact. In accordance with the SCEEP requirements for a Category I/II project, an EIA would be required for the SGCCUP, providing a formal assessment of all possible environmental effects of the plant upgrade works being completed to ensure that the identified effects are mitigated, through design, monitoring or engineering controls as part of the project. To meet the environmental assessment requirements of the SCEEP and the State Environmental Expertise (SEE) Regulations (2001), the environmental assessment is completed over three stages aligned with the engineering design stages:

- Pre-feasibility stage: - Stage 1: Draft Environmental Impact Statement (DEIS) ("Проект заявления о воздействии на окружающую среду (проект ЗВОС)");
- Feasibility stage of the design: Stage 2: Environmental Impact Statement (EIS) "Заявление о воздействии на окружающую среду (ЗВОС)");
- Definitive feasibility study / detailed design stage of the project. Stage 3: Statement of Environmental Consequences (SEC) ("Заявление об экологических последствиях (ЗЭП)").

At each stage of the environmental assessment relevant documentation is to be submitted to the SCEEP for their review and approval. As part of the review the SCEEP can make further recommendations and set out additional requirements that have to be considered by subsequent environmental assessment stages.

As stated in Chapter 1, a locally compliant EIA in accordance with the National; SCEEP EIA requirements and will be submitted to the SCEEP as a separate document (to this ESIA).

4.7 Lender Specific Policies and Standards

4.7.1 Overview

The SGCCUP and UNG are seeking international finance for the development of this Project. The ESIA will utilise the following standards, guidelines and processes:

- The Equator Principles (2013);
- The OECD Common Approaches (2016);
- The World Bank EHS Guidelines, including the General HSE guidelines (2007) and applicable Industry Sector Guidelines;
- The IFC-PS 1 to 8 (IFC 2012);

4.7.2 Equator Principles

The Equator Principles provide a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects. They are intended to provide a minimum standard for due diligence and risk decision-making (http://www.equator-principles.com). Equator Principles are defined to cover the following areas:

- Principal 1: Review and Categorization;
- Principal 2: Environmental and Social Assessment;
- Principal 3: Applicable Environmental and Social Standards;
- Principal 4: Environmental and Social Management System and Equator Principals Action Plan;
- Principal 5: Stakeholder Engagement;

- Principal 6: Grievance Mechanism;
- Principal 7: Independent Review;
- Principal 8: Covenants;
- Principal 9: Independent Monitoring and Review; and
- Principal 10: Reporting and Transparency.

4.7.3 Organization for Economic Cooperation and Development (OECD) Common Approaches

The ESIA shall be completed following the approach of the OECD Common Approaches (2016). This outlines common approaches for undertaking environmental and social due diligence to identify, consider and address the potential environmental and social impacts and risks relating to financial applications (OECD, 2017).

4.7.4 IFC Performance Standards

The IFC-PS (IFC, 2012) are a series of eight GIIP guidelines used to support project planning and feasibility studies, covering best international practice ESIA. They require a combined ESIA to be completed, ensuring that social impacts are given equal assessment coverage. In general the IFC / GIIP requirements require more detailed environmental and social consideration in comparison to a nationally compliant EIA, and specifically the Uzbekistan environmental permitting requirements. The Performance Standards are outlined below:

- PS 1: Assessment and Management of Environmental and Social Risks and Impacts: This emphases the importance of (i) integrated assessment to identify environmental and social impacts, risks and opportunities of projects; (ii) effective community engagement; and (iii) the client's management of environmental and social performance throughout the life of the project.
- PS2: Labor and Working Conditions: This focuses on the balance of economic growth and income generation protection, with the fundamental rights of workers. This encompasses fair treatment of workers, compliance with employment and labor laws, protection of workers and to promote safe and healthy working conditions.
- PS3: Resource Efficiency and Pollution Prevention: This PS outlines a project level approach to resource efficiency and pollution prevention. Its objectives cover the minimization of adverse impacts on human health and the environment, promotion of the sustainable use of resources and to reduce project related greenhouse gas emissions.
- PS4: Community Health, Safety and Security: The objective of this PS is focused upon avoidance of adverse impacts on the health and safety of Affected Communities during the Project lifecycle from routine and non-routine activities. It outlines the safeguarding of personnel and property follows relevant human rights principals to avoid or minimize risks to Affected Communities.

- PS5: Land Acquisition and Involuntary Resettlement: The PS provides standards relating to project related land acquisition and landuse restrictions that can have adverse impacts on communities and users of the land. It outlines objectives to avoid forced eviction; to provide compensation for loss of assets; and to improve, restore the livelihoods and standards of displaced persons.
- PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources: PS6 focusses upon protection and conservation of biodiversity; maintenance of ecosystem services; and sustainable management of living natural resources, as fundamental to sustainable development.
- PS7: Indigenous Peoples: This PS aims to ensure that development process fosters full respect for indigenous peoples and that adverse effects on Indigenous Peoples are anticipated and avoided. It aims to promote sustainable development benefits and to establish ongoing relationships with Indigenous Peoples affected by a project throughout its lifecycle.
- PS8: Cultural Heritage: PS8 covers the objectives of protection of cultural heritage from adverse impacts from project activities; and to promote the sharing of benefits from the use of cultural heritage.

4.7.5 World Bank IFC Environmental, Health and Safety Guidelines

The World Bank Group's EHSGuidelines (World Bank, 2007) provide technical reference and good international industry practice covering Environmental, Occupational Health and Safety, Community Health and Safety and Construction and Decommissioning.

4.7.6 Specific Project Standards

In addition to the Guidelines and Standards detailed in the previous sections, the following best practice / guidelines have been utilised in preparation of the ESIA in accordance with the environmental specialisms:

Air & Greenhouse Gas (GHG) Emissions:

- The Greenhouse Gas Protocol guidance and tools for calculating the GHG emissions;
- Ap-42 guidelines for calculating emissions rate from flare and other combustion sources;
- Uzbekistan ambient Air quality standards; and
- SGCC air quality standards.

Noise:

- SanPiN No. 0267-09 noise standards.

Geology:

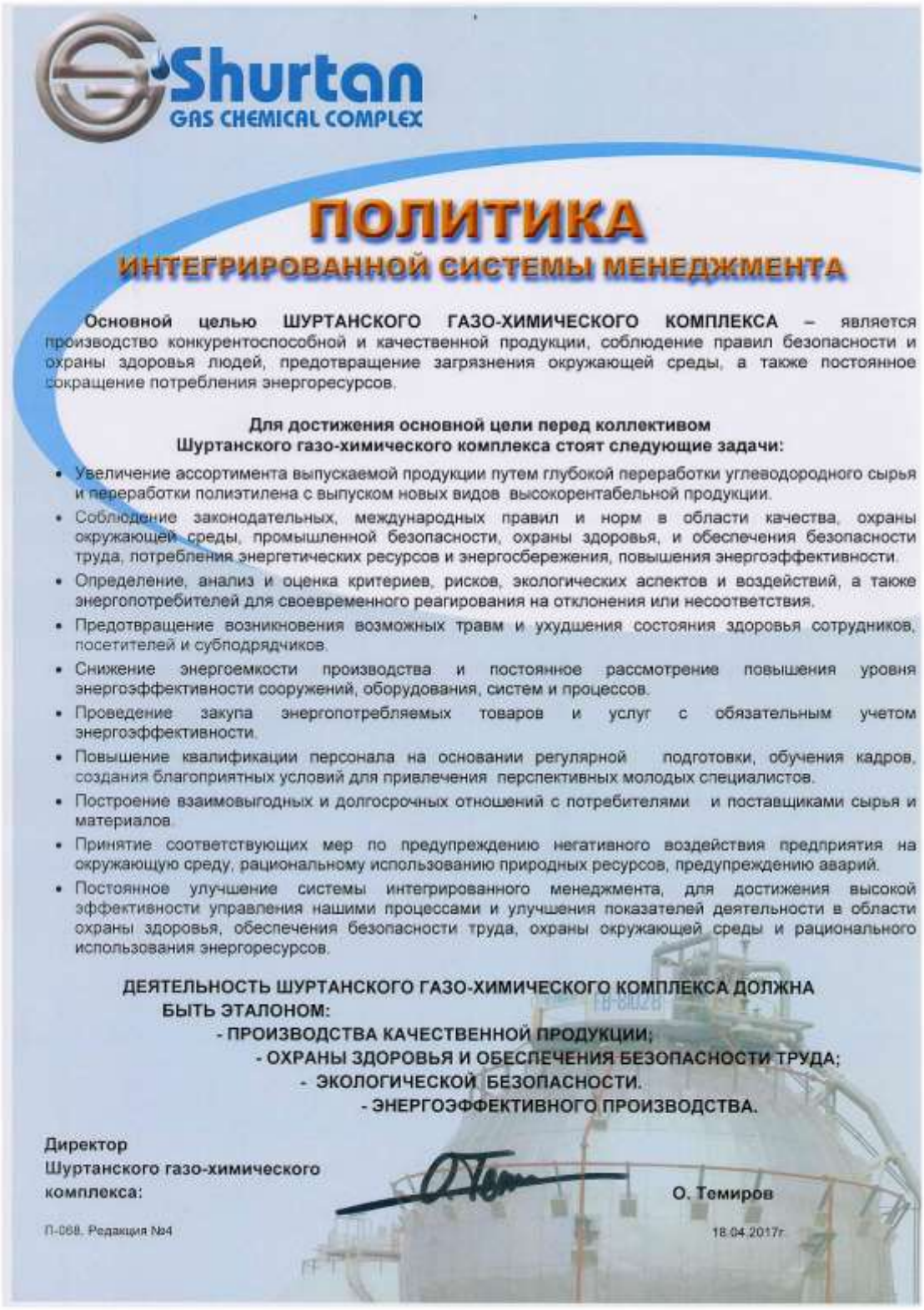
- Uzbekistan seismic code KMK 2.01.03-96 "Norms and Regulations for Construction in Seismic Zones".

Water:

- IFC General EHS Guidelines for wastewater;
- GOST 2874-82 - Drinking water. Hygienic requirements and quality control.

4.8 SGCC Environmental Policy and Corporate Environmental Standards

SGCC, as the overall responsible entity for all HSE matters associated with the project will ensure all upgrade works completed as part of the project are carried out safely and in accordance with the SGCC Integrated Management System Policy, covering environmental, health and safety matters (Figures 11 and 12 below).



Shurtan
GAS CHEMICAL COMPLEX

ПОЛИТИКА
ИНТЕГРИРОВАННОЙ СИСТЕМЫ МЕНЕДЖМЕНТА

Основной целью ШУРТАНСКОГО ГАЗО-ХИМИЧЕСКОГО КОМПЛЕКСА – является производство конкурентоспособной и качественной продукции, соблюдение правил безопасности и охраны здоровья людей, предотвращение загрязнения окружающей среды, а также постоянное сокращение потребления энергоресурсов.

Для достижения основной цели перед коллективом Шуртанского газо-химического комплекса стоят следующие задачи:

- Увеличение ассортимента выпускаемой продукции путем глубокой переработки углеводородного сырья и переработки полиэтилена с выпуском новых видов высокорентабельной продукции.
- Соблюдение законодательных, международных правил и норм в области качества, охраны окружающей среды, промышленной безопасности, охраны здоровья, и обеспечения безопасности труда, потребления энергетических ресурсов и энергосбережения, повышения энергоэффективности.
- Определение, анализ и оценка критериев, рисков, экологических аспектов и воздействий, а также энергопотребителей для своевременного реагирования на отклонения или несоответствия.
- Предотвращение возникновения возможных травм и ухудшения состояния здоровья сотрудников, посетителей и субподрядчиков.
- Снижение энергоемкости производства и постоянное рассмотрение повышения уровня энергоэффективности сооружений, оборудования, систем и процессов.
- Проведение закупа энергопотребляемых товаров и услуг с обязательным учетом энергоэффективности.
- Повышение квалификации персонала на основании регулярной подготовки, обучения кадров, создания благоприятных условий для привлечения перспективных молодых специалистов.
- Построение взаимовыгодных и долгосрочных отношений с потребителями и поставщиками сырья и материалов.
- Принятие соответствующих мер по предупреждению негативного воздействия предприятия на окружающую среду, рациональному использованию природных ресурсов, предупреждению аварий.
- Постоянное улучшение системы интегрированного менеджмента, для достижения высокой эффективности управления нашими процессами и улучшения показателей деятельности в области охраны здоровья, обеспечения безопасности труда, охраны окружающей среды и рационального использования энергоресурсов.

ДЕЯТЕЛЬНОСТЬ ШУРТАНСКОГО ГАЗО-ХИМИЧЕСКОГО КОМПЛЕКСА ДОЛЖНА БЫТЬ ЭТАЛОНОМ:

- ПРОИЗВОДСТВА КАЧЕСТВЕННОЙ ПРОДУКЦИИ;
- ОХРАНЫ ЗДОРОВЬЯ И ОБЕСПЕЧЕНИЯ БЕЗОПАСНОСТИ ТРУДА;
- ЭКОЛОГИЧЕСКОЙ БЕЗОПАСНОСТИ.
- ЭНЕРГОЭФФЕКТИВНОГО ПРОИЗВОДСТВА.

Директор Шуртанского газо-химического комплекса: **О. Темиров**

П-068. Редакция №4

18.04.2017г.

11 SGCC Integrated Management System Policy (Russian) (Source: SGCC, 2017).

Shurtan GAS CHEMICAL COMPLEX

MANAGEMENT INTEGRATION POLICY

The main goal of SHURTAN GAS AND CHEMICAL COMPLEX (SGCC) is to produce competitive and high quality products, adhere to safety rules and health care, prevent environmental pollution as well as progressively reduce energy consumption.

SGCC has the following objectives to reach the goal:

- Increase product line through deep hydrocarbons raw conversion and processing of polyethylene manufacturing new kinds of highly-profitable products.
- Adhere to legislative, international rules and regulations in terms of quality, health, safety, security and environment, energy resources demand and energy saving, energy efficiency.
- Define, analyze and assess criteria, risks, environmental aspects and impacts as well as energy consumers to timely respond to any deviations or variances.
- Prevent possible injures and accidents of personnel, visitors and sub-contractors.
- Decrease energy-output ratio and regular address promoting energy efficiency of buildings, equipment, systems and processes.
- Procure energy-consuming products and services with compulsory energy efficiency.
- Raise qualification of personnel based on regular training, personnel development, ensuring favorable conditions to attract ambitious young specialists.
- Build mutually beneficial and long-term relations with consumers and suppliers of raw and other materials.
- Adopt adequate actions to prevent negative environmental impact of the plant, rational use of natural resources and damage control.
- Constantly improve integrated management system to achieve management efficiency of processes and enhance performance indicators in terms of health care, safety, environment and rational use of energy resources.

PERFORMANCE OF SHURTAN GAS AND CHEMICAL COMPLEX SHALL EXEMPLIFY:
- PRODUCTS OF HIGH QUALITY;
- HEALTH CARE AND LABOR SECURITY;
- ENVIRONMENTAL SAFETY;
- ENERGY EFFICIENCY PRODUCTION.

Director of
Shurtan Gas and Chemical Complext: **O. Temirov**

П-068, Revision №4 18.04.2017

12 SGCC Integrated Management System Policy (Translation) (Source: SGCC, 2017).

5. ESIA APPROACH & METHODOLOGY

5.1 Introduction

The ESIA aims to characterise and assess all potential environmental and social impacts associated with the SGCCUP. The methodology for this assessment follows Good International Industry Practice (GIIP), and the principles of the IFCPS (IFC 2012). This chapter provides an overview of the ESIA approach and methodology utilised in the assessment of the identified impacts. The assessment of potential environmental and social impacts and the Environmental and Social Management Plan presenting impact mitigations is presented Chapters 10 -11 of the ESIA.

5.2 Impact Assessment Methodology

5.2.1 Scoping Phase

The ESIA Scoping Report (Advisian 2017) considered the project aspects, identified potential receptors associated with each baseline area and undertook a preliminary review of the potential impacts. The preliminary assessment identified the following potentially significant aspects requiring further development in the ESIA:

Table 10 – Summary of aspects identified during Scoping Phase

Preliminary Aspect	Phase		
	Installation / Commissioning	Operations	Decommissioning
Atmospheric emissions (including dust)	✓	✓	✓
Flaring emissions		✓	
Hazardous waste management		✓	✓
Non-hazardous waste management	✓	✓	✓
Water in-take	✓	✓	✓
Oil and chemical spill	✓	✓	✓
Aqueous discharge	✓	✓	✓
Wildlife disturbance (noise, vibration, light)	✓	✓	✓
Storage of oils, chemicals and fuels	✓	✓	✓
Flood and drainage management	✓	✓	✓
Water supply	✓	✓	✓

Preliminary Aspect	Phase		
	Installation / Commissioning	Operations	Decommissioning
Noise	✓	✓	✓

5.2.2 Impact Assessment Overview

The Impact Assessment for the SGCCUP has been completed in accordance with the requirements GIIP and the principles of the IFC Performance Standards. Impacts are defined as physical changes to the physical, biological and / or socio-economic environment attributable to the construction and operation of the SGCCUP, which will occur at different scales and extents over time and space.

Following the work completed during the Scoping Phase, potential impacts have been developed and assessed as further project description information has been made available. The significance of the impacts has been defined through consideration of the impact magnitude, receptor sensitivity and the probability of the impact occurring. This is done both pre-mitigation and post-mitigation, taking account of measures incorporated into the project design to reduce or remove impacts. Where the impact assessment has defined high or moderate significance impacts, further consideration is given to additional mitigation measures, in conjunction with the design elements, to adequately compensate for the impacts. Finally, the significance of any potential residual impact is assessed. The following sections provide further definition of the stages of the impact assessment.

5.2.2.1. IMPACT MAGNITUDE

The assessment of impact magnitude utilizes the criteria and descriptions defined in Tables 11 and 12 below, which are tailored according to the specific environmental discipline.

Table 11 – Summary of impact magnitude criteria

Criteria	Description
Class	The classification of the impact addresses whether it has a beneficial (positive) or adverse (negative) effect on the receptors. Potential positive effects are noted as such but are not subject to further assessment.
Importance / Sensitivity of Receptor	This sensitivity rating (low, moderate or high) allows the more important or vulnerable receptors to be afforded a greater weighting in the impact evaluation process.
Magnitude	The magnitude criterion considers the scale of the impact affecting the receptor.
Spatial Extent	The spatial extent of impact considers the geographical area over which the impact will be experienced, from a project-specific area to a trans-boundary scale.
Duration	An impact may occur only while a project activity is active (e.g., noise), or it could persist long after a project activity has ceased (e.g., habitat permanently lost to other land uses). In the latter case, duration of impact may be regarded as the time

Criteria	Description
	the environmental receptor needs to recover from the effect. Thus, the duration-of-impact descriptor incorporates the concept of reversibility / irreversibility of an impact.
Timing and Frequency	The timing and frequency of an impact considers whether proposed operations will coincide times of the year when receptors are particularly sensitive (e.g., important breeding seasons). The frequency of an impact can vary in line with the associated environmental aspect and this can affect how a receptor is affected. For example, an impact may only occur once during a project or may occur multiple times during the lifetime of the operation.
Potential for Cumulative Effects	Cumulative impacts can occur when more than one project activity affects a receptor or when different existing or planned future developments or operations take place within the vicinity of the proposed project.
Applicable / Relevant Legislation	Federal and provincial, and sometimes local, legislation relevant to the project needs to be considered during the impact assessment. The legislation may apply to air emissions, discharge limits, waste management, or protected species, and any breach of the set standards is automatically considered to be of major importance.
Public Concern	Public opinion surrounding a proposed project needs to be incorporated into the assessment process such that impacts that are likely to result in greater public concern are afforded a higher importance ranking.

Table 12 – Summary of impact definitions

Positive		Negative		
Beneficial	Negligible	Minor	Moderate	Major
Positive impacts on the surrounding biological, physical and socio-economic environment, e.g., local employment and local procurement of supplies and services.	Impacts are considered negligible or indistinguishable from background variation.	Typically, impacts are defined by the following:	Typically, impacts are defined by the following:	Typically, impacts are defined by the following:
		Low sensitivity receptor	Moderately sensitivity receptor	Highly sensitivity receptor
		Small magnitude	Moderate magnitude	Large magnitude
		Project area specific	Extending beyond the project area	National or trans-boundary in extent

Positive		Negative		
Beneficial	Negligible	Minor	Moderate	Major
		Short duration	Medium duration	Medium-long duration (or permanent)
		e.g., project timing does not coincide with relevant breeding seasons.	e.g., project timing may coincide with relevant breeding seasons.	e.g., project timing coincides with relevant breeding seasons.
		Cumulative effects unlikely.	Cumulative effects possible.	Cumulative effects likely.
Positive impacts are noted as such but are not subject to further assessment.	Negligible impacts are noted as such but are not subject to further assessment.	Compliant with applicable legislation and guidelines.	Approaching legislative limits.	Non-compliant with legislation (1).
		Low public concern.	Moderate public concern.	Widespread public concern.
Note 1: Any impacts that are deemed to breach relevant legislation are automatically considered to be of major significance.				

5.2.2.2. RECEPTOR SENSITIVITY

Consideration of receptor sensitivity is defined in terms of the ability of the receptor to withstand adverse impacts and its vulnerability to the impact. For example, the designation of receptor sensitivity considers its importance in relation to aspects such as conservation status, international or national designations, economic value and cultural importance. Classification of receptor sensitivity is completed using a qualitative rating scale of High-Moderate-Low-Negligible, using professional judgement and GIIP. The definitions for each receptor have been developed according to the characteristics of each environmental discipline.

5.2.2.3. IMPACT SIGNIFICANCE

The resultant impact significance is determined by ranking impact magnitude against the receptor sensitivity (Table 13). Impact significance is defined in accordance with the definitions specified in Table 14.

Table 13 – Impact Significance

		RECEPTOR SENSITIVITY			
IMPACT MAGNITUDE (inc Likelihood)		**NEGLIGIBLE**	**LOW**	**MODERATE**	**HIGH**
	NEGLIBIBLE	Not significant	Not Significant	Not Significant	Low / Not significant*
	LOW	Not significant	Low	Moderate / Low*	Moderate
	MODERATE	Not significant	Moderate / Low*	Moderate	High
	HIGH	Low	Moderate	High	High

**Discretion of reviewing specialist / technical author dependant on specific receptor and expected impact*

Table 14 – Impact Significance Definitions

Significance Definition	
High	Impacts with a 'high' significance are likely to significantly disrupt/degrade/alter the value of the identified receptor or resource over the long term, and may have wider impacts on related receptors and resources e.g. wider ecosystem. These classified impacts are a high priority for mitigation measures to ensure avoidance or significant reduction of the impact to an acceptable level.
Moderate	Impacts that result in lasting and noticeable changes to the baseline conditions. This may result in degradation/alteration of the receptor or resource, over a medium to long-term period. Mitigation measures are a priority to avoid or reduce the impact to an acceptable level.
Low	Impacts that result in noticeable changes to baseline conditions, the results of which are detectable. These impacts are not expected to result in significant degradation or alteration to baseline conditions. The impacts should be avoided where possible or mitigated if this is practical.
Not Significant	Impacts are generally indistinguishable from the baseline or natural variations. Mitigation is not required.

For each baseline discipline, the impacts were assessed using the above methodology and impacts both pre- and post-mitigation considered. In addition to the methodology defined above, the professional judgement and expertise of the technical authors were used to assess the impacts. Each impact assessment section presents a summary of the pre- and post-mitigation assessment and the reasoning behind the overall significance finding. Any post-mitigation residual significance level is also highlighted.

5.2.2.4. IMPACT MITIGATION

The ESIA identifies opportunities to reduce adverse impacts recorded as 'Moderate' or 'High' through proposing of practical and cost-effective mitigation measures. Each discipline assessment includes discussion of the types and locations of mitigation measures to be applied to the Project to reduce or eliminate adverse effects. The mitigation measures suggested as part of the impact assessment will be developed in parallel with the design process. The process of identifying "design controls" and "mitigation measures" considered the mitigation hierarchy, as specified in IFC PS1, will be applied in

the management of the identified risks. This may comprise preventative, corrective or compensatory measures.

Mitigation measures will include commitments to long-term operation and maintenance as well as monitoring required ensuring their effectiveness. All the measures identified during the impact assessment have been incorporated into the Environmental and Social Management Plan (Chapter 11).

5.2.2.5. RESIDUAL IMPACT ASSESSMENT

Each impact assessment includes a summary of residual impacts, which are considered to be likely to remain 'Moderate' or 'High' following implementation of recommended mitigation measures. If the significance cannot be reduced further, discussion is made as to why this is the case considering the relevant practicalities and additional mitigations suggested. Where recommendations are made for ongoing monitoring, this will also be identified in the Environmental and Social Management Plan (see below section).

5.2.2.6. PRELIMINARY ENVIRONMENTAL & SOCIAL MANAGEMENT PLAN

A Preliminary Environmental and Social Management Plan (Chapter 11) captures all mitigation, management measures and commitments, defined following the impact assessment process; and any additional requirements defined by other permitting, SGCC or lenders requirements.

6. PUBLIC CONSULTATION & DISCLOSURE

6.1 Introduction & Objectives

As defined by the IFC the objectives and requirements for ESIA stakeholder engagement are as follows:

1. Stakeholder Identification and Analysis:
    - Determination of who the project stakeholders are, and their key groupings and sub-groupings;
    - In-depth review of stakeholder group interests, how they will be affected and to what degree, and what influence they could have on the project; and
    - Provides the basis from which to build a stakeholder engagement strategy.
2. Information Disclosure:
    - Dissemination of introductory project information to stakeholders;
    - Information should be accessible to interested and affected parties, in a language and level of detail to allow clear understanding; and
    - All other activities, including consultation, informed participation, negotiation and resolution of grievances will be affected by the quality and accuracy of the information disclosed.
3. Stakeholder Consultation
    - Consultation should be a two-way process between the Project and its stakeholders;
    - Must allow for the development of constructive external relationships; and
    - Can assist in development of a ‘social license to operate’, when undertaken early in the project lifecycle.
4. Negotiation and Partnerships
    - Required to reach agreement on a specific issue or set of issues;
    - The quality of stakeholder relationships are key, to establish trust and credibility; and
    - Important to maintain realistic expectations and develop mutually acceptable outcomes.
5. Grievance Management
    - Environmental and social impacts may cause grievances and have implications for business performance; and
    - A grievance mechanism should be scaled to fit the level of risks and impacts of a project;
    - A good overall engagement process, established at an early stage of the Project will reduce and/or prevent grievances from arising.

6. Stakeholder Involvement in Project Monitoring

   - Stakeholder concerns can be alleviated by involving them in the monitoring of mitigation measures, environmental and social programmes;
   - Monitoring will strengthen relationships between the Project and its stakeholders; and
   - Stakeholder involvement will encourage participating stakeholders to take responsibility for their environment and welfare.

7. Reporting to Stakeholders

   - Ensures maintenance of good relationships;
   - Should be completed after consultation so that stakeholders know which of their ideas, concerns and suggestions have been incorporated; and
   - Should be completed throughout the monitoring process so that stakeholders are informed about the projects impacts and the effectiveness of the mitigation measures.

8. Management Functions

   - Stakeholder engagement is good practice and a standard part of corporate and social responsibility, and environmental and social management systems;
   - Mangers should identify stages of the Project where stakeholder engagement is needed, to ensure good practice is maintained; and
   - Managers should determine who will deliver the actions and integrate it with core business functions.

A Stakeholder Engagement Plan (SEP) was prepared for the SGCCUP (Appendix 1) which outlined the requirements for identification of relevant stakeholders and the requirements for information disclosure, namely to:

- Provide information and raise awareness about the project and it's lifecycle to identified stakeholders;
- Provide information on the intended environmental and social management;
- Provide stakeholders with the opportunity to ask questions, provide feedback / suggestions, and also raise concerns for consideration as part of the ESIA and overall project design; and
- To provide information on SGCC's practices relating to environmental management and protection, and occupational health and safety in relation to the upgrade projects design, construction and operation.

6.2 Identification of Key Stakeholders

Stakeholder identification was completed through desktop research and discussions with SGCC, and stakeholder categories shown in Table 15 were determined, formulating into the Stakeholder Register (Appendix 1).

Table 15: Stakeholder Categories

Stakeholder Category	Key Interests
National Government Agencies	Interest in the national EIA and permitting procedures. Specialist knowledge in specific subject matters. Project permitting.
Regional and local administrative units	Overall project description and programme. Impacts and benefits of the project.
NGOs – international, national and local	Overall project description and programme. Environmental and social interest. Varying degrees of influence.
Communities	Overall project description and programme. Environmental and social impacts and benefits interest.
Industry Partners	Overall project description and programme. Interest in the safe and successful execution of the Project without impacting on their own operations
Academia	Overall project description and programme. Environmental impacts and benefits, environmental protection, environmental monitoring

6.3 Consultation, Engagement and Disclosure Activities Completed

Public hearings were held by representatives of Uzbekneftegaz, SGCC, and WorleyParsons Tashkent during February 2018. The meetings focused on providing project description, site setting information and detail pertaining to the ESIA and its overall assessment findings and environment and social management recommendations. Notices of the public hearings were placed in four newspapers (local, regional and national) as summarised in Table 16 below.

Table 16: Summary of newspaper public hearing notices

Newspaper Name	Coverage: local / regional/ national	Date of the Letter to the Editor	Date of the Notice Publication	Language of Publication
Ғузор хаёти (Guzor khayoti – Life of Guzar)	Local	18/01/18	25/01/18	Uzbek
Нишон тонги (Nishon tongi - Dawn of Nishan)	Local	16/01/18	19/01/18	Uzbek
Қашқадарё (Qashqadaryo - *Kashkadarya*)	Regional	18/01/18	20/01/18	Uzbek

Newspaper Name	Coverage: local / regional/ national	Date of the Letter to the Editor	Date of the Notice Publication	Language of Publication
Правда востока (Pravda vostoka - Truth of the East)	National	19/01/18	23/01/18	Russian

Four public hearings were held at the following locations:

- 13 February 2018 from 10 am till 1 pm at Nishan region, Nuristan village, “Talimardzhan TES” Cultural centre;
- 14 February 2018 from 10 am till 1 pm at Guzzar region, Eshankuduk village, Guzzar Transport College;
- 16 February 2018 from 10 am till 1 pm in Karshi, “GISARNEFTGAZ” assembly hall;
- 23 February 2018 from 10 am till 1 pm in Tashkent, Mirzo Uglebskiy region, 66 Mustakillik prospect.

Reference should be made to Appendix 1 which provides the SEP, public hearing presentation materials and the full records of the public hearings and the list of attendees.

6.3.1 Summary of Key Questions and Concerns Raised

Appendix 1 presents the full list of questions and comments raised during each of the Public Hearings, either orally or via written comment sheet, and how they have been addressed as part of the ESIA and/or SGCCUP. Table 17 below details the general themes raised during the Public Hearings.

Table 17: Summary of key themes from public hearings

Comment Theme	Issues Raised
Baseline Data	Confirmation of baseline monitoring data sources used in the ESIA for soils, emissions, water resources and ecology.
BAT	Implementation of BAT technologies e.g. for renewable energy; and to reduce environmental impact.
Community Assistance	Requests received for programmes to assist with infrastructure relating to vulnerable persons, medical care, water resources, education and provision of green space.

Comment Theme	Issues Raised
Emissions	Consideration of transboundary air emissions and impacts; confirmation of waste and water disposal facilities and processes, overall impact of emissions on the environment
Employment	Worker requirements during construction phase; regiona; / local unemployement status; Recruitment policy for local workers.
General ESIA	Confirming understansding of ESIA methodology and Impact Assessment criteria / indicators; managing impacts and mitigation measures; international ESIA compliance
Health Impacts	Effects on health of populations living in nearby settlements; child mortality reductions; impact of discharges and hazardous substances on health;
Impact Assessment	Impact assessment methodology, criteria and level of analysis; Environmental impact on flora and fauna and biological diversity; Impacts from modinization of plant on emissions; Impacts from natural resource use.
Landuse	Assurance all settlements in proximity of the plant had been considered; Tree and vegetation planting in the vicinity of the Project; Consideration of agriculture lands.
Mitigation Measures & Monitoring	Approach to mitigation measures and the monitoring programme; Consideration of monitoring of impacts after project implementation; Confirmation of monitoring requirements for ecology, water, atmosphere and soil; Review of monitoring results by external agencies.
Project Design	Confirmation of upgrade capacity and compliance with HSE legislation; Clarifications on waste water discharge; Consideration of vehicle density during construction; Planned additional forestry areas as part of the project; Programme duration of the project; Potential for avoidance of use of potable water resources for production needs; Cumulative effects from other large plant in the Karshi region;
Socioeconomic Impacts	Inclusion of public health statistics for Shurtan operational period and potential impact on health; Consideration of recreational areas in the region as part of the project.

6.4 Future Engagement and Disclosure Activities

6.4.1 Construction & Operations

Whilst outside the remit of this ESIA, stakeholder engagement should be continued through the project life cycle in accordance with GIIP. By undertaking engagement with stakeholders during the construction and operations phases links will be maintained with stakeholders and confirmation can

be provided to the relevant stakeholder groups that mitigations and commitments provided as part of the ESIA have been implemented. During these phases the SEP should be reviewed and updated as applicable to reflect significant project changes and / or requirements for additional engagement.

6.4.2 Decommissioning

Stakeholder engagement should be maintained during a decommissioning phase to reduce impacts from potential environmental or social legacy issues. A revision to the SEP should be undertaken specifically for the decommissioning and closure phase of the SGCC site.

6.5 Roles and Responsibilities

The responsibility for stakeholder engagement for the life cycle of the SGCCUP is maintained by SGCC.

6.6 Grievance Mechanism

Any grievances reported during the ESIA stakeholder engagement and disclosure activities were recorded by SGCC for resolution in accordance with the SGCC Grievance Mechanism's. It remains the responsibility of SGCC to report and resolve all grievances in accordance with their procedure to ensure mutually acceptable resolution within a reasonable timeframe.