Ministry of Mines and Petroleum (MoMP)

Afghanistan GAS Project (AGASP) (P172109)

ENVIRONMENTAL AND SOCIAL AUDIT
FOR

Sheberghan to Mazar-e-Sharif Gas-Pipeline (Completed Segment-44 Km) and Amine Plant

September 14, 2019

Afghanistan. Area of operations in red

Table of Contents

Acronyms

AGASP	Afghanistan GAS Project
AEITI	Afghanistan Extractive Industries Transparency Initiative
AGE	Afghanistan Gas Enterprise
AMA	Afghanistan Mining Authority
APA	Afghanistan Petroleum Authority
EHSG	Environmental, Health and Safety Guidelines
EPRP	Emergency Preparedness Response Plan
ESA	Environnemental and Social Audit
ESF	World Bank Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
EPSA	Ex-Post Social Audit
ESS	Environmental and Social Standard (of the World Bank ESF)
ESSU	Environmental and Social Safeguards Unit
GoIRA	Government of Islamic Republic of Afghanistan
GRM	Grievance Redress Mechanism
MEW	Ministry of Energy and Water
MoF	Ministry of Finance
MoLSAMD	Ministry of Labor, Social Affairs, Martyrs and Disabled
MoMP	Ministry of Mines and Petroleum
NEPA	National Environmental Protection Agency
OESMP	Operation Environmental and Social Management Plan
OHSP	Occupational Health and Safety Plan (OHSP)
O&M	Operation and Maintenance
PAP	Project Affected People/Persons
PPE	Personal Protection Equipment
QHSSE	Quality, Health, Safety, Security, Environment
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
SCADA	Supervisory Control and Data Acquisition
SESA	Strategic Environmental and Social Assessment
SIA	Social Impact Assessment
SMGP	Gas Pipeline from Sheberghan to Mazar-e-Sharif
ToR	Terms of Reference
USAID	U.S. Agency for International Development
USGS	United States Geological Survey
WB	World Bank
WHO	World Health Organization
WPS	Welding Procedure Specifications

Executive Summary

This Environmental and Social Audit (ESA) and Operation Environmental and Social Management Plan (OESMP) and Ex-Post Social Audit (EPSA) assessed the Environmental, Social and Health and Safety impacts and risks of the already constructed 44 km Sheberghan to Mazar Gas Pipeline (SMGP) and the amine plant (already in place). The overall length of the Gas Pipeline is 89.1 km. There is an Environmental and Social Management Framework and Resettlement Policy Framework (ESMF/RPF) prepared which will be followed for the remaining 45.1 km of the gas pipeline. This subproject is part of the Afghanistan GAS Project (AGASP) to generate electricity for the Mazar area.

This Audit assessed the Environmental and Social impacts and risks of the already constructed 44 km of the gas-pipeline and amine plant, and the study found these risks and impacts are limited, only impacting eight PAPs directly in one village who lost a small portion of their land. There is a stand-alone Ex-Post Social Audit (EPSA) prepared which provides compensation details to the affected families. The main risk during construction of the 44 km was the Health and Safety Risk. Fortunately, no accidents happened during construction. The Health and Safety Risk is also the main risks during operation of the SMGP: fire and explosion risk during operation. Erosion of the SMGP could also be a potential risk. The security situation in the project area is a major concern.

A preliminary OESMP budget has been presented and it estimates to $1,992,000. The costs for the OHS and EPRP Plan will be included in the O&M Contract.

AGE and PIU conducted separate consultations meetings with all affected families in Mir Qasim village (including the female headed family) in the completed section (44km) during their initial socio-economic survey in 2018-2019. Public consultations conducted with CDCs and other stakeholder, such as local and provincial authorities (including central AILA-Arazi and NEPA officials) linked to land acquisition, social and environmental issues were also organized.

A Stakeholder Engagement Plan (SEP) and Labor Management Procedures (LMP) have already been prepared and will be followed for the O&M phase, including mitigation measures for Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA). A Code of Conduct (COC) is prepared and will be signed by all O&M workers prior to start work.

The GRM is already in place with the GRC set up at local, site and Ministry levels.

The Amine Plant is in operation since 2018. The plant is located 8 km from the nearest villages, which implies that the risks for Community Health and Safety are low if relevant security access measures are implemented. Main pollutants are H_2S, CO_2 and wastewater containing heavy metals. H_2S is combusted in a gas flare. Wastewater is collected in a wastewater pond which is unsealed at the bottom. Heavy metals could have leached to the groundwater. NEPA monitors air pollutions, which is in compliance with national and international standards. An action plan to improve environmental management is presented. The plant has an OHS manager who is responsible for OHS management. OHS management needs to be strengthened. The amine plant involves no land acquisition impact, as the plant is located on state land.

The O&M Contractors will be required to prepare and implement an Operational Environmental and Social Management Plan (OESMP), Occupational Health and Safety Plan (OHS Plan) and an Operational Emergency Response Preparedness Plans (EPRP) and recruit qualified and experienced E&S staff as well

as OHSAS 18001:2007, NEBOSH or similar certified OHS Specialist(s). The detailed actions plan is presented below.

Measures and Actions to Mitigate the Project's Environmental, Social, Health and Safety Risks and Impacts		Timeframe	Responsibility
1	**REGULAR REPORTING TO WORLD BANK**: Prepare and submit regular monitoring reports on the implementation of the OESMP and Occupational Health and Safety Plan (OHS).	Semi-annually	AGE ESU/MoF/MoMP
2	**BIDDING DOCUMENTS AND CONTRACTOR CONTRACT:** AGE includes ESMP in bidding documents and in O&M Contractor and Owner's Engineer Contracts.	Prior to launching bidding documents and prior to signing Contracts	AGE ESU/MoF/MoMP
3	**O&M CONTRACOR REPORTS TO AGE ESU**	Monthly	O&M Contractor
4	**INCIDENTS AND ACCIDENTS NOTIFICATION**: Promptly notify any incident or accident related or having an impact on the Project which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers including environmental and social related field that requires assessment. Provide enough detail regarding the incident or accident, indicating immediate measures taken to address it, and include information provided by any contractor and supervising entity, as appropriate.	Promptly within 24 hours after taking notice of the incident or accident.	O&M Contractor, AGE ESU/O&M /MoMP/MoF
5	**ENVIRONMENTAL, SOCIAL, HEALTH AND SAFETY REPORTS (ESHS Report)**: Prepare and submit ESHS summary report.	Annually	AGE/MoMP/ MoF
6	**ORGANIZATIONAL STRUCTURE**: AGE establishes an Environmental and Social Unit (ESU) with qualified and experienced E&S and certified OHSAS 18001:2007, NEBOSH or similar OHS staff to support preparation and implementation of Operation ESMP (OESMP), Decommissioning ESMP (DESMP) and Operation and Decommissioning OHS Plans, as well as an Emergency Preparedness Response Plan.	Prior to start of operation and prior to start of decommissioning	AGE
7	**O&M CONTRACTOR RECRUITS QUALIFIED AND EXPERIENCED E&S STAFF AND OHSAS 18001:2007, NEBOSH OR SIMILAR CERTIFIED OHS PERSONNEL:** O&M Contractor prepares and implements OESMP and OHS Plan.	Prior to start construction	Contractor/ Owner's Engineer/AGE ESU
8	**MANAGEMENT TOOLS AND INSTRUMENTS:** Develop timeline for finalization of individual management plans identified in the OESMP and DESMP, based on the planned sequence of operation and decommissioning activities. Develop individual management plans in accordance with the approved timeline and update as needed. The following plans will be prepared: • Work camp and Lay down management plan • Emergency preparedness response plan • Site rehabilitation plan • Air, soil and water quality management plans, including erosion management plan	Prior to operation and prior to decommissioning	Contractor/ /AGE ESU.

Measures and Actions to Mitigate the Project's Environmental, Social, Health and Safety Risks and Impacts		Timeframe	Responsibility
	• Waste and hazardous materials management plan • Transport management plan • Explosives management plan • Noise and vibration management plan • Biodiversity survey plan		
9	**OHS:** Develop and implement procedures for managing environmental and social performance and occupational health and safety (OHS) during operation and decommissioning.	Prior to operation and decommissioning	Contractor/ Owner's Engineer/AGE ESU
10	**PERMIT, CONSENTS AND AUTHORIZATIONS**: Obtain operation permits or authorizations from relevant authorities to • Operate the gas pipeline, • Disposal and management of hazardous wastes.	3 months Prior to initiating operation activities.	O&M /AGE ESU.
11	**THIRD PARTY MONITORING***:* According to the SEP it has been agreed that a stakeholder or third parties will be engaged to complement and verify the monitoring of environmental and social, as well as the health and safety risks and impacts of the Project, during operation and decommissioning, such as: • Employee and Community Health and Safety; • Noise pollution management; • Air and water quality management; • Biodiversity; • Waste and hazardous materials management	Annual basis during operation and decommissioning	Third Party who should be a certified Auditor /AGE ESU/O&M.
12	**DEVELOP AND IMPLEMENT PROCEDURES FOR SUB CONTRACTOR:** Develop and implement procedures: • for managing sub-contractors, including requirements to include appropriate OESMP and Operation and Decommissioning OHS requirements in contracts and subcontracts • for monitoring compliance by contractors with their contractual commitments • for overseeing implementation of relevant OESMP and OHS requirements.	Include in contracts of sub-contractors.	Contractors/ Owner's Engineer/AGE ESU/O&M.
13	**LABOR MANAGEMENT PLAN (LMP)**: Prepare labor management plan consistent with national law and ESS2, and ensure they are available to all project workers. Labor management plan should address all issues identified in ESS2, including the applicable requirements regarding non-discrimination and equal opportunity to all stratum of the communities.	Prior to performing work	Contractors/ Owner's Engineer/AGE ESU/MoF
14	**GRIEVANCE REDRESS MECHANISM (GRM) FOR PROJECT WORKERS:** Develop, implement and maintain a grievance mechanism for Project workers.	Prior to commencing works.	Contractors/ Owner Engineer/AGE ESU/MOF

Measures and Actions to Mitigate the Project's Environmental, Social, Health and Safety Risks and Impacts		Timeframe	Responsibility
15	**OHS MEASURES**: Develop and implement occupational, health and safety (OHS) measures and recruit certified staff. The contractors are required to develop and implement OHS plans or comply with main Project OHS Plan. Plan requirements to include (but not be limited to): • Safety training for all personnel in their language, covering hazards and safety protocols of their jobs • Job- and task-specific hazard analysis and controls for all activities • Adequately mark construction sites • Provision of personal protection equipment (PPE), requirements for use of PPE, and enforcement of PPE use • Recording incident statistics, including total work hours, lost time incidents, major injuries, fatalities, etc. • Oversight of OHS implementation, including mandatory reporting.	Prior to operation and decommissioning, prepare and implement the respective OHS plans	Contractor/ Owner's Engineer/ AGE ESU / MoF
16	**EMERGENCY PREPAREDNESS RESPONSE**: As part of the OHS measures specified in 2.3, include measures on emergency preparedness response for: • Operation period and • Decommissioning period. Ensure workers and contractors are trained. Implement the plan as needed.	Plan 3 months prior to operation and decommissioning periods. Workers will be trained prior to commencing the project work	Contractors/ Owner's Engineer/ AGE ESU
17	**PROJECT WORKERS TRAINING**: Implement training of Project Workers designed to heighten awareness of risks and to mitigate impacts on local communities.	Training conducted prior to initiating operation and decommissioning, with regular refresher training	Contractor/ Owner Engineer/ AGE ESU
18	**TERMS AND CONDITION OF EMPLOYMENT:** Prepare information regarding terms and conditions of employment to be provided to project workers at the beginning of the working relationship and ensure that project worker is aware of information.	Develop and disseminate prior to engagement of project worker	Contractor/ Owner's Engineer/AGE ESU/O&M.
19	**MANAGEMENT OF WASTE AND HAZARDOUS MATERIALS:** Develop and implement measures and actions to manage waste and hazardous materials, manage all wastes and hazardous materials in accordance with approved plans and restore and stabilize all disturbed areas with revegetation etc. for permanent erosion control, with preference for grass/vegetation cover. Implement remedial plans to address contamination and other issues identified in the audit of existing construction activities and site, and to improve management practices for wastes, hazardous materials, etc.	Develop plan prior to operation and decommissioning and implement plans throughout operation and decommissioning until all sites are cleaned, rehabilitated, stable and vegetated.	Contractors/ Owner's Engineer/AGE ESU

Measures and Actions to Mitigate the Project's Environmental, Social, Health and Safety Risks and Impacts		Timeframe	Responsibility
20	**EROSION CONTROL AND SITE STABILIZATION PLANS:** Finalize and implement erosion control and site stabilization plans for implementation by O&M and decommissioning contractors to include at a minimum: • Topsoil salvage, storage, and reuse for restoration • Stable storage and disposal of excavated material or fill material • Drainage control designed into roads and other permanent features • Restore and stabilize all disturbed areas with revegetation etc. for permanent erosion control, with preference for grass/vegetation cover.	Plans will be implemented continually until complete	Contractor/ Owner's Engineer/AGE ESU
21	**AIR QUALITY MANAGEMENT PLANS FOR GAS PIPELINE:** Finalize air quality management plans for operation and decommissioning, including controlling, and requiring contractors to control, emissions of dust and other air pollutants by: • Water sprays or other means to reduce dust generation in dry weather • Vehicle and equipment maintenance • Site restoration as soon as practicable after construction ends • Monitor ambient air quality.	Finalize plan before operation and decommissioning starts Implement controls throughout operation and decommissioning	Contractors/ Owner's Engineer/AGE ESU.
22	**EXPLOSIVE MANAGEMENT PLAN:** Develop and implement explosive management plan to minimize risks from transportation, storage and use of explosives	Finalize plan before operation starts Implement controls throughout operation	O&M/AGE ESU.
23	**TRAFFIC AND ROAD SAFETY:** Develop and implement a road safety management plan to address the impacts on local communities of moving construction equipment and the transport of workers to the site.	Plan prior to start of operation and decommissioning. Maintained throughout life time of project.	Contractors/ Owner's Engineer/AGE ESU.
24	**COMMUNITY HEALTH AND SAFETY:** Develop and implement measures and action to assess and manage specific risks and impacts to the community arising from Project activities, including in relation to Project Workers and any risks of labor influx.	Plans prior to initiating operation and decommissioning and implemented throughout life time of project.	Contractors/ Owner's Engineer/AGE ESU.
25	**GBV AND SEA ACTION PLAN:** Develop and implement measures and action Plan to assess and manage the risks of gender-based violence (GBV) and sexual exploitation and abuse (SEA).	Plan Prior to initiating construction.	Contractor/ Owner's Engineer/AGE ESU.
26	**GBV AND SEA RISKS DURING PROJECT IMPLEMENTATION:** Specify additional funds available to implement measures to	Plan Prior to initiating operation and decommissioning.	Contractors/ Owner's

Measures and Actions to Mitigate the Project's Environmental, Social, Health and Safety Risks and Impacts		Timeframe	Responsibility
	address GBV and SEA risks and impacts that may arise during the gas pipeline operation and decommissioning.		Engineer/AGE ESU
27	**CODE OF CONDUCT:** All workers have to sign a Code of Conduct prior to start working which prohibits GBV, SEA, child labor, forced labor, discrimination based on race, religion, gender, etc.	At the time of signing labor contract.	Contractors/ Owner's Engineer/AGE ESU
28	**EMERGENCY RESPONSE MEASURES:** Develop and Implement Emergency Response Plan for operation and decommissioning based on the Risk Hazard Assessment, Review and update plan based on experience.	Plan prior to operation and decommissioning. Review and update at least annually throughout life time of project.	Contractors/ Owner's Engineer/AGE ESU
29	**TRAINING SECURITY PERSONNEL:** Train Project security personnel adequately in the use of force and firearms, and appropriate conduct toward workers and affected communities; and require them to act within the applicable law, to well manage the risks to human security of project-affected communities and project workers that could arise from the use of security personnel. Security protocol should cover the code of conduct.	Plans prior engaging security personnel Implement throughout operation and decommissioning	Contractors/ Owner's Engineer/AGE ESU
30	**ORIENTATION FOR THE COMMUNITY:** Conduct orientation for the community designed to heighten awareness of risks and to mitigate impacts specified in this section.	Communities training prior to local work, Enforcement throughout operation and decommissioning	Contractors/ Owner's Engineer/AGE ESU
31	**TRAINING FOR THE WORKERS:** Train workers as to how they interact with local communities, and enforce requirements so as to minimize disruption on local communities created by workers.	Prior to local work, with annual refresher training.	Contractors/ Owner's Engineer/AGE ESU
32	**CLOSE RELATION WITH LOCAL AUTHORITIES:** Develop and implement program to work with local authorities to build institutional and infrastructure capacity to deal with issues (housing, disease, health care, etc.) arising from influx of workers and others.	Meeting prior to local work, conducting training.	Contractors/ Owner's Engineer/AGE ESU
33	**Remedial Management Plan FOR GAS PIPELINE**: Develop and implement prior to project negotiations.	Prior to undertaking Project activities	MoMP/AGE ESU/MoF
34	**OPERATION ESMP (OESMP) and Decommissioning ESMP (DESMP):** Operation and Decommissioning Contractors prepare and implement an OESMP and DESMP for the Gas Pipeline Project.	Prior to undertaking Project activities. Disclose in-country and on the World Bank website after approval.	Operation and Decommissioning Contractors/ AGE ESU
35	**GRIEVANCE REDRESS MECHANISM (GRM) FOR PAPs AND COMMUNITIES**: Develop and implement a Grievance Redress mechanism for PAPs and Communities (e.g. damage during	Prior to commencement of resettlement	Contractors/ Owner's

Measures and Actions to Mitigate the Project's Environmental, Social, Health and Safety Risks and Impacts		Timeframe	Responsibility
	construction) to address their concerns about compensation, relocation or livelihood restoration and other resettlement infrastructure. GRM for community has already been in place and needs strengthening.	activities or operation or decommissioning.	Engineer/AGE ESU/MoF.
36	**BIODIVERSITY RISKS AND IMPACTS:** Aquatic and terrestrial biodiversity in the entire project area is very poor. Biodiversity impacts have been assessed as insignificant. No mitigation measures are required.	No mitigation measures are required.	
37	**RESTORATION PLAN FOR ALL DISTURBED AREAS:** Develop and implement site restoration plan for all disturbed areas. Plan will include revegetation with native species wherever possible and will require monitoring of disturbed areas until vegetation is well-established and self-sustaining. Invasive alien flora species will be monitored and eradicated during construction and operation.	Plan prior disturbance and implement plan as soon as practicable after active disturbance ends or enters extended period of inactivity.	Contractors/ Owner's Engineer/AGE ESU
38	**SITE SPECIFIC ENVIRONMENTAL OR SOCIAL METHOD STATEMENT:** Ensure that Site Specific Environmental and Social Method Statement is developed by the Contractors, approved by the Owner's Engineer and/or AGE ESU and implemented by the Contractors.	Prior to carrying out difficult operation with significant environmental, social or health and safety risks and impacts.	Contractors/ Owner's Engineer/AGE ESU
39	**CULTURAL HERITAGE:** Identify measures to address risks and impacts on cultural heritage and develop plan of removing and transferring in case of accidental find. Include in all Contractor Contract a "Chance Find Procedure"	Prior to disturbance of site.	Contractors/ Owner's Engineer/AGE ESU
40	**Operation ESMS (OESMS) and Decommissioning ESMS (DESMS):** Establish and maintain an environmental and social management system (ESMS).	Prior to start operation or decommissioning.	Contractors/ Owner's Engineer/AGE ESU
41	**SEP IMPLEMENTATION:** Implement the SEP.	Throughout Project operation and decommissioning.	Contractors/ Owner's Engineer/AGE ESU.
42	Training on Occupational Health and Safety including on emergency prevention, preparedness and response arrangements to emergency situations (as described below).	MoMP/CDC/CSO Project Workers	Contractor/ Owner's Engineer /AGE/ESU

1 Introduction

1.1 Project Description (AGASP)

1) The proposed Afghanistan GAS Project (AGASP) is designed to provide technical assistance to the Ministry of Mines and Petroleum in the following key areas:

- Support the construction of the Sheberghan-Mazar Gas Line, including procurement of equipment, Quality Assurance/Quality Control (QA/QC), design and engineering, contractual and regulatory monitoring, environmental and social monitoring.
- Support the establishment and strengthening of the Afghan Oil and Gas Regulatory Agency (AOGRA);
- Developing Ministry's professional skills; and
- Improving transparency and oversight of hydrocarbons resources management.

1.2 Project Development Objectives of the AGASP

2) to facilitate a sustainable supply of gas through targeted investments in gas infrastructure and enhanced gas sector governance .

a. Project Components

3) The project consists of three main components, namely:

Component-A Sustaining Gas Supply: The objective of this component is to support the sustained supply of commercial quality natural gas for Sheberghan and Mazar IPPs power generation and industrial uses through (a) targeted technical assistance and transaction support to hydrocarbons related investments in the near and mid-term, and (b) support to the construction and installation of natural gas infrastructure, including a gas-line and gas processing facility.

The subproject will finance under this component the construction of the Sheberghan to Mazar-e-Sharif Gas-line, which runs approximately 89.1 km. Starting in 2016, AGE began to undertake the construction of the new gas-pipeline, and approximately 44 km (out of the planned 89.1 km) have been laid along the route of the old structure. The subproject will also finance a new Amine Unit and Gas Dehydration Units.

Component-B Strengthening Sector Governance: The objective of this subcomponent it to provide technical support to MoMP and AGE to ensure sustainable natural gas deliverability including the development and optimization of upstream field facilities, midstream transport and downstream distribution value chain, initially in compliance with supply commitments assumed by the government with the Sheberghan and Mazar IPPs and, eventually, for the use of domestic natural gas for industrial, commercial, residential and transport use

Component C: Project Management, monitoring and evaluation

a. Scope of the Environmental and Social Audit

4) The ESA prepared by the client as a key element for the retroactive management of the identified environmental and social, health and safety impacts of the 44 km of the Gas-Pipeline from Sheberghan to Mazar-e-Sharif and the Amine Plant, which have been already constructed. This ESA also to assessed potential land/asset impacts of the completed segment of 44 km, including guidance on the Ex-Post Social Audit (EPSA) with details on Budget for financing the implementation.

5) The following activities were undertaken in the context of the preparation of this ESA report:

- An evaluation of the gas producing fields (Jarquduq, Khoja Gogerdaq, and Yatimtaq) as well as an evaluation of the gas-line corridor during the site visits undertaken by the ESA Consultant;
- Review of the activities conducted by the contractor under the supervision by AGE. 44km of the gas-line of 89.1km long has already been welded, but only 19km were backfilled. 25km were just welded and left unprotected on the surface near the open trench;
- Review of the national requirements for ESA/EPSA preparation;
- Review of the World Bank's Environmental and Social Framework (ESF).
- Stakeholder mapping/identification and analysis, including preparation of stakeholder engagement plan (SEP).
- An assessment of social and environmental impacts, which already occurred, that include: (i) establish the social economic and environmental profile of the area (including baseline E & S survey), (ii) demographic information of the affected communities; inventory of the affected land/assets, (iii) land ownership details, and (iv) 100 percent census survey.
- Propose appropriate mitigation measures with responsibilities for implementation and monitoring of retroactive environmental and social management mitigation measures.
- Conduct meaningful consultation with all affected people and stakeholders on draft ESA study.
- Establishing a sub-project Grievance Redress Mechanism (GRM) for addressing grievances linked to project activities.

a. Background of the Gas-pipeline from Sheberghan to Mazar-e-Sharif (SMGP)

6) The primary purpose of the gas gas-pipeline is to ensure reliable and sustainable delivery of commercial quality gas to customers in Sheberghan and Mazar-e-Sharif areas in accordance with contracted conditions. The Government of Afghanistan (the 'Government') assigned Ministry of Energy and Water (MEW) and Ministry of Mines and Petroleum (MoMP) to achieve that objective because the existing aged infrastructure operated by Afghan Gas Enterprise (AGE) has not been able to meet growing gas consumption demands due to a number of reasons.

7) Based on available information, scientific assessment of recoverable gas reserves was accomplished by Soviet specialists more than 30 years ago. Since that time, very limited and unsystematic studies have been completed for several gas fields. Since 2004, at least six consulting companies have attempted to assess the effective deliverability of gas fields in the north of Afghanistan. The results of different assessments vary significantly and could be argued.

8) Systematization of available data and a comprehensive study plan for all discovered and operated gas fields are required to mitigate gas shortage risks in the future. The results of that work would help to develop a project portfolio and break it down into urgent, short-term, mid-term, and long-term projects to ensure sustainable gas production for the next 25 years, which is the minimum design life for known gas consumers.

9) AGE is needed to increase gas production and transportation from current 330 Mscmd up to 1,130 Mscmd to supply fuel gas for new Bayat Power-1 Independent Power Plant (IPP) and Mazar IPP, which are under construction and planned to be commissioned in 2019. To fulfil its contractual obligations, AGE need to accelerate the Gas Pipeline from Sheberghan to Mazar-e-Sharif (SMGP) construction and debottleneck the process \ to treat an increased volume of quality gas as is required in the contracted Gas Quality Specification. AGE specialists are highly skilled in

craftsmanship (welding, construction operations). However, they do not have the required knowledge and experience in terms of Quality Assurance and Quality Control, Health, Safety and Environment (HSE), design management system and engineering documentation, construction procedures, method statements, completion dossiers as well as in commissioning of new process units/equipment, which is usually done by vendors. AGE also struggles from the lack of construction machines, equipment, materials, Personal Protective Equipment (PPE), consumables, testing equipment. The above identified weaknesses need to be urgently strengthened along the lines as presented in Appendix 1.

a. Existing Location of Gas Fields and gas pipeline

a) Amine plant- Gas Fields

10) The existing gas producing basin of the Amu Darya basin is situated within Afghanistan. The four gas fields are Yatimtaq, Jarquduq, Shakarak and Khoja Gogerdaq situated between 15 km and 35 km from Sheberghan. Locations of Sheberghan city and gas fields are illustrated below in the Gas Fields Map below.

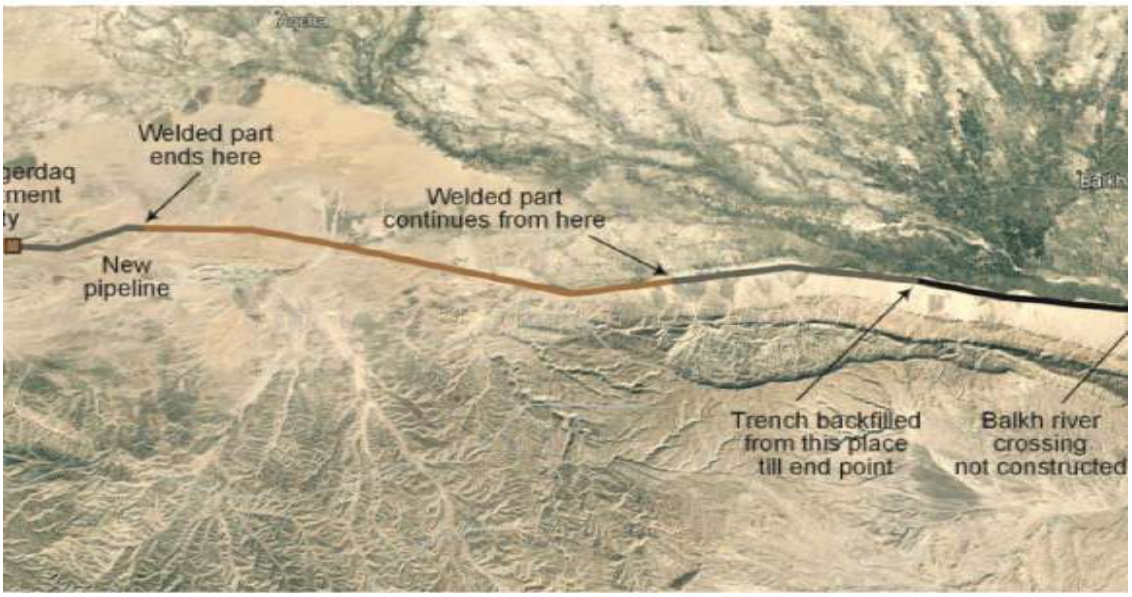
The map below shows the four gas fields in Sheberghan province

b) Gas pipeline

Old and new gas-line routes go through the provinces:

- Balkh Province; and
- Jawzan Province

The map below shows the gas-pipeline route- completed segment (44 km) and the remaining segment (45.1 km)


Welded part
ends here
Welded part
continues from here
New
pipeline
Trench backfilled
from this place
till end point
Balkh river
crossing
not constructed

11) ESA Methodology

12) Identification and assessment of environmental and social impacts and risks, both positive and negative, as well as health and safety risks derived from the construction of the first 44 km of the gas-pipeline, and the future operational and decommissioning activities of the SMGP. For the risks and impacts identification and ranking a table format along the structure of the ESS1 to 6 and 8 has been used to illustrate the significance of each identified risks and impacts, based on a significance scale for low, moderate, substantial and high-risk categorization. To evaluate the significance of identified environmental and social risks, as indicated in the matrix below, it is necessary to estimate both the potential impact (e.g., consequences if the risk were to occur) and probability (e.g. the likelihood of the risk occurring) for each identified risk. The risks identified are for operational and decommissioning phases only, since the construction has already taken place.

Table 1: Risk Categories

Significance	Definition	Description
Low	The impact has low significant risk to the people and the environment either short term or long term	Negligible or very little adverse impacts on communities, individuals, and/or environment.
Moderate	The impact is short term and cause limited risk to the people and the environment	Limited impacts in terms of magnitude (e.g. small affected area, low number of people affected) and duration (short), may be easily avoided, managed, mitigated with best practice techniques.
Substantial	Impacts give rise to substantial concern, may cause long term social & environmental problems	Adverse impacts on people and/or environment of significant magnitude, spatial extent and duration, (but still mostly temporary, reversible).
High	Impact is long term, large scale, irreversible, diverse and unprecedented	Highly significant adverse impacts on human populations and/or environment. Adverse impacts high in magnitude and/or spatial extent (e.g. large geographic area, large number of people, transboundary impacts, cumulative impacts) and duration (e.g. long-term, permanent and/or irreversible); areas impacted include areas of high value and sensitivity (e.g. valuable ecosystems, critical habitats); adverse impacts to rights, lands, resources and territories of indigenous peoples; involve significant displacement (economic and/or physical).

a. Methodology of Data Collection

13) To prepare this report, the data were collected by conducting meetings with stakeholders that provided detailed information on the crossings and route path, as well as necessary arrangements details relating to gas-pipeline, gas fields, amine plant, construction as well as operation activities.

14) Other data specific to this project were collected from the site visits that were carried out to ascertain the land usage in regions surrounding the gas fields, amine plant and gas-line route. The site visits covered as many areas as possible in addition to the gas-pipeline path prepared by AGE/MEW, by moving along the roads that are adjacent to the path, whenever possible to do so.

15) Preliminary desk review of the maps was carried out with the designed gas-pipeline path to determine potential sensitive receptors project vicinity. The team had made several stops during the site visits to capture important photographs close to the proposed gas-line locations in addition to identifying a variety of flora and fauna that this project implementation can potentially affect. In wake of the far away distances of townships to gas fields' sites and nearest villages, the consultant deemed it unnecessary at this point to carry out baseline measurements (noise and air quality).

a. Available Data and Documents

16) At the time of preparation of the ESA, the Consultant has familiarized with the following core documents and data that assisted in preparation of the ESA report:

- Satellite imageries and topographical maps of project area;
- Surveyed data relating to social structure and ecology based on numerous field missions;
- Information gathered from consultations with AGE/MEW staff and local experts in Sheberghan; and
- Associated reports as well as recent studies within the domain.

a. Sub-project Categorization

17) Since the length of this gas-line, its location, and local environmental and social conditions the sensitivity of this sub-project of AGASP is expected to be low to moderate. The main risk is the security risk in the project area. The entire AGAS project has been classified as substantial Risk.

18) Under Afghanistan's ESIA Regulation, the project can be assigned category 2 for the following reasons:

- Construction, upgrading, installation and development of thermal power generation facilities less than 200 MW;
- Oil and gas transmission systems;
- Oil and gas extraction projects, including exploration, production, gathering systems, separation and storage.

19) This entails that the project developers obtain a certificate of environmental compliance from the National Environmental Protection Authority (NEPA), as a regulatory institution for environmental issues.

20) Institutional Arrangements

i. Ministry of Mines and Petroleum

21) **Ministry of Mines and Petroleum (MoMP).** The MoMP is the core government entity responsible for overseeing the management and development of the extractives sector. Over the years, through several donor-funded programs, including from the World Bank, DFID, GIZ, USAID, the government has attempted to rationalize and prioritize the operations of the Ministry to focus its efforts primarily on establishing a modern and transparent legal, policy and strategic framework for sector development.

22) Today the core responsibilities of MoMP include sector development oversight, policy and strategy, and investment promotion. There are four state owned enterprises (SOEs) that operate under the remit of the MoMP, including (i) the Mazar-e Sharif Northern Fertilizer and Power Plant (NFPP), (ii) the North Coal Enterprise (NCE) which owns four coal mines in Northern Afghanistan, (iii) Afghan Gas Enterprise (AGE), headquartered in Jawzjan, and (iv) the Jabal-al-Saraj Cement Enterprise.

23) Further restructuring of MoMP is expected. As envisioned in the Government's sector roadmap (2018), "MoMP will retain and strengthen its policy-making role, while relinquishing its regulatory and operational roles." The Ministry of Mines and Petroleum has undertaken a number of actions over the last 12 months to reform its organizational structure. A new organizational structure has been developed based on the Mining Sector Roadmap, the 2018 Hydrocarbons Law.

24) **Afghanistan Oil and Gas Regulatory Authority (AOGRA).** AOGRA, formally created by decree in September 2018 as an independent regulator with an organizational structure separate from that of MoMP, is charged with responsibility for contractual and regulatory oversight over the oil and gas value chain, including exploration, development, processing, transport and commercialization of hydrocarbon resources. Its responsibilities include geological data management, contract management and compliance, regulatory, monitoring and oversight. The Bank has been approached to provide immediate capacity building and advisory support for the operationalization of the newly established institution.

25) While AOGRA is assigned responsibility over contractual oversight and regulatory compliance, the Hydrocarbons Law stipulates that MoMP retains sole authority over sector policy; hence, ultimate responsibility for the development and content of contract models, fiscal regimes and regulations will continue to reside with MoMP (subject to approval by the Cabinet), while executive responsibility for their operationalization will be assumed by AOGRA. This approach follows recommended international practice. The Bank has concurred with the need to eliminate parallel functions within the sector's institutional structure; at the same time, however, it has recognized that mutually reinforcing, interdependent and effectively coordinated parallel organizational structures within both institutions are necessary to ensure an adequate system of checks and balances for sector oversight. Namely, while there should be no duplication of functions in the sector and a clear separation of roles and responsibilities should be strictly observed, the oil & gas sector structures within MoMP's and those of OGRA should mirror each other, such that each institution can effectively fulfill its remit as reflected in the Law, by ensuring there is a seamless space for mutual cooperation, reinforcement and consultation between functional counterparts at MoMP and AOGRA for the implementation and operationalization of sector policy.

i. Afghan Gas Enterprises (AGE)

26) The Afghan Gas Enterprises (AGE) is a State-Owned Enterprises registered among the Ministry of Finance's assets. AGE was formed in 1967 to explore and develop natural gas in Afghanistan and became a Government enterprise in 1983. As of 2011, approximately 6,000 people were either directly employed or indirectly impacted by the Afghan state gas sector. AGE currently has about approximately 950 employees; the employee profile is one of an aging group of senior employees with some general management qualifications, but a low overall ratio of formal qualifications and industry specific expertise, although there is significant longevity of service among many of the staff. Salaries paid to AGE workers are significantly lower than salaries paid to state enterprise employees in the coal sector. Salaries and allowances are based on the civil service pay scales, labor laws and the Law on State Owned Enterprises. There are seven representative organizational departments in support of the President and, as would be expected, most of these discharge technical and operational functions.

i. Afghanistan Extractive Industries Transparency Initiative (A-EITI)

27) The A-EITI is a joint platform for key stakeholder in the extractive industry, which is co-chaired by the MoMP, and its Secretariat is housed within the Ministry of Finance (MoF). The World Bank provides technical support to the A-EITI through its advisers. The main objective behind setting-up A-EITI is to; i) promote constructive dialogue on contract disclosure, ii) beneficial ownership and revenue transparency, iii) citizen engagement through awareness raising and public consultations, and iv) the establishment of a non-discretionary mining cadaster. There is emphasis in the engagement and role of citizens in the extractive industries which to a large extent ensures good governance, transparency, and accountability. The multi-stakeholder nature of the EITI has also provided a valuable forum for dialogue among the industry, civil society and industry stakeholders.

i. International Conventions

28) Afghanistan is signatory to several international conventions that are applicable in the AGAS project. The country is also party to 'Convention on Protection of the World Cultural and Natural Heritage (1972)' which requires all member states to cooperate in ensuring an appropriate and equitable balance between conservation, sustainability and development, so that World Heritage properties can be protected through appropriate activities contributing to the social and economic development and the quality of life of our communities.

29) The UN convention on Biological Diversity (1992), to which Afghanistan is a party, acknowledges the concern that biological diversity is being significantly reduced by certain human activities and that it's the States responsibility to conserve their biological diversity and use it in a sustainable manner.

30) On Social and employment related conventions, Afghanistan is signatory to the 'Weekly Rest (Extractive Industry) Convention- 1921', which requires the License Holders in member countries to provide at least twenty-four consecutive hours of rest to its staff in every period of seven days. Being signatory of the 'Underground Work (Women) Convention -1935' it is prohibited to employ female in underground work in mines regardless of their age, however they may hold management position that do not require manual work in Mines, or work in health and welfare services, and may occasionally have to enter the underground parts of mines for training or other non-manual occupation purposes.

31) Furthermore, Afghanistan has ratified 19 ILO Conventions, such as the 'Protection of Wages

Convention - 1949', 'Equal Remuneration Convention – 1951', 'Abolition of Forced Labor Convention - 1957', 'Discrimination (Employment and Occupation) Convention – 1958', , and 'Minimum Age Convention - 1973' which is 14 years for workers in the extractive industry, , 'Occupational Cancer <convention – 1974', and 'Vocational Rehabilitation and Employment (Disabled Persons) Convention – 1983', 'Safety and Health in Mines Convention - 1995', 'Worst From of Child Labor Convention – 1999' .

32) Environmental and Social Baseline

a. Introduction

33) This section describes the project's current existing environmental and social aspects regarding ecological and physical resources, cultural/social resources and economic development. This description is based on analysis of maps, literature review of available reports, and the Consultant's visit to the gas fields, amine plant, baseline survey of the constructed portion of 44 km of the gas-line.

a. Topography and Soils

34) The project is situated in the Jowzjan and Balkh provinces of Afghanistan. Notably, nearly one quarter of these provinces is either mountainous or semi-mountainous; flat land accounts for the remaining three quarters.

35) The topography surrounding this project site forms part of vast loess-nestled plain which abutting the Hindu Kush's foothills into the south before extending across the border into Uzbekistan and Turkmenistan to the north. The plain gently rolls or runs flat with elevations of between 350 and 550 m. It may be noted that the Sar-e-Pul River valley bifurcates this plain nearly 15 km from Sheberghan and 3 km east of Jerquduq. Loess loam is the main soil type at the project site. Generally, loess soils have excellent permeability and are capable of absorbing copious amounts of water. Meanwhile the northern plain-based soils are the primary agricultural soils, which makes the Mazar-e-Sharif region Afghanistan's main food-producing area.

a. Geology and Seismicity

36) The area's geology includes Neogene and Quaternary (Pleistocene) sediments consisting of very thick loess beds, in addition to alternating and overlying layers of sands, pebbles/gravels, silts and clays. These sediments are a consequence of the erosion of the mountains. On the other hand, modern alluvial deposits can be seen across the river valleys. The Quaternary sediments can be seen to overlie Mesozoic conglomerates, limestones, siltstones, sandstones, and shales spanning across several kilometers in depth. Gently faulted to form the reservoir strata as well as structures for the natural gas resources of the region, the mesozoic rocks get exposed to the southern portion within the foothills of the Hindu Kush. Being adjacent to the Hindu Kush's northern edge where orogenic processes remain active, the area is seismically active. The region has historically witnessed many strong earthquakes, measuring more than 5.8 on the Richter scale.

a. Climate and Air Quality

37) Sheberghan region's climate is typically dry with significant variations in annual daily temperature. Winter (December to February) in the region is mostly cloudy and mild, with a mean minimum/maximum temperature of -1.5 to 1.5 °C and 7 to 10 °C, respectively. Meanwhile cold winter

winds can have the temperatures to reduce to -22 °C for brief periods of time. Precipitation falls four to six days each month as rain and sporadically it snows, although fallen snow melts rapidly. Spring (March to April) is generally known to witness rapid warming in the day time and precipitation occurs in the form of short afternoon downpours. Rainfall is highest during the month of March, with a monthly average of 56.4 mm while the average yearly rainfall is 231 mm. Summers (May to September) are typically hot and dry with mean monthly minimum and maximum temperatures of 14 to 22 °C and 30 to 39 °C, respectively. Temperatures of 45°C can occur during the days. During summer, daytime relative humidity does not go past 25 to 30% and rains are rare occurrences. Fall (October to November) starts off by being clear and eventually turns cloudy and rainy. Days are warm while nights are cool in the fall.

38) Winds meanwhile are mainly south-easterly and primarily north-westerly. East winds are a common phenomenon in fall and winter, with wind speeds of 2 to 3 m/s. Strong winds (up to 20 m/s) are often rare and can occur in early summer or late spring, usually causing dust storms and lowering visibility up to several meters.

39) At the project site, ambient air quality is expected to be good as per these characteristics: (1) the sites are situated in a semi-desert area of nearly 15-30 km from Sheberghan, wherein industries remain the most frequent of all air pollution sources; (2) these sites are relatively exposed in terms of topography and not impervious to atmospheric inversions. With, concentrations of particulate materials are expected to remain high throughout the region due to the prevailing winds and characteristics of soil transport.

40) In Sheberghan City, the air quality is likely to be negatively affected by the vehicular emissions as well as the burning of oil refinery residues. Throughout Afghanistan, vehicular density is on the rise and most vehicles are running on low-grade diesel fuel. As per testing done by UNEP, poly aromatic hydrocarbons and dust were traced in Mazar-e-Sharif and other cities.

a. Water Resources

41) The gas fields are located within the Northern River Basin's Sar-e-Pul watershed; Northern River Basin is one of five river basins found in Afghanistan with the smallest yearly flow contribution among all, accounting for a mean volume of 1,880 m3 - 2% of the country's overall annual river discharge. The area of Sar-e-Pul watershed is 16,743 km2, which makes up for 2.6% of the total area of Afghanistan. Two main rivers drain this watershed: The Ab-iSya River as well as the Sar-e-Pul River that join 10 km southwards of Sar-e-Pul. A diversion structure found downstream divides this river into two channels - Darya-i-Sya (east side) and Darya-i-Safid (west side). Before reaching the Amu Darya River, these channels dry up in desert sands or irrigation canals situated north of Sheberghan City.

42) Maximum amount of discharge from Sar-e-Pul is found in April and May, which underpins the overbearing impact of snowmelt on the river flow. Minimum discharge meanwhile is found in the month of August. Annual average flow rate is reported to be nearly 6 m3/s.

43) Groundwater that gets recharged by precipitation as well as its direct recharge into the project sites is unlikely to be sufficient. Where available, groundwater resources are likely to be quaternary aquifers that get recharged by rivers as well as streams coming downwards from the high mountains and permeating into alluvial fans. Furthermore, there is also a possibility of water infiltration into the aquifers via the Sar-e-Pul River as well as from the irrigation channels running across the Sar-e-Pul valley. Therefore, groundwater resources are probably confined to areas immediately bordering the

Sar-e-Pul River.

a. Ecological Resources

44) The natural vegetation surrounding the project sites comprises of semi-desert. The sparse ground cover comprises of grasses that are resistant to drought, such as sheep fescue, needle grass, sedge, and blue grass. By mid-summer, the landscape assumes a desert appearance as the grasses die away. In the Sar-e-Pul valley, arable land located nearly 25 km at the western part of the project site witnesses a plantation of barley, wheat, and corn.

45) The region serves as a habitat for several vertebrate species, such as falcons, ground squirrel, caracal cats, jerboas, and striped hyenas. No known rare or endangered species are found within the project site.

a. Economic Development

46) Economic development of this project area has suffered several setbacks over the past decades due to of civil strife and wars. In this period, important areas of economic resources were actively obliterated or eventually faded away due to the absence of maintenance.

47) There was also a massive loss of human resources in the form of military casualties, and internal/external displacement of workers. Consequently, the Sheberghan area is full of badly damaged factories and workshops, as well as inadequate supporting infrastructure and a largely unskilled workforce to make them run.

48) However, economic recovery is gradually occurring in the region, primarily led by a construction boom, favorable response of service industries to global reconstruction assistance projects, as well as recovery within the agricultural sector. The hydrocarbon sector has also witnessed a revival in Jawzjan province over the past decade, which has been efficacious in heralding the region's socioeconomic growth.

49) Sheberghan also signifies a vial regional facility for the adjoining hinterland and serves as a regional market for goods such as agricultural products, a service hub for education and health facilities, as well as a transportation center as can be seen by the traffic witnessed on the ring road (to and from Turkmenistan, Iran, Pakistan and Kazakhstan) to the province of Sar-e-Pul. In addition, Sheberghan has a serviceable regional airport situated nearly 10 km to its east.

50) For most of the population in the city, water supply is provided by in-house supply sourced from protected tube wells for relatively affluent residents, and hand-pumped wells on the street-side that are shared by many individuals residing within poorer communities.

51) Sheberghan however, lacks a sewer system that runs across the city, although larger guest houses and residences have septic tanks. Most residences benefit from a rudimentary organic waste collection system wherein organic waste gets channeled into an alcove street-side. Thereafter, it is gathered by a dirt-cart operator to be used as fertilizer. Several government facilities meanwhile have a lidded bucket.

52) The hinterland of Sheberghan is deceptively small-sized and witnesses extensive usage of horticultural land within the river basins (primarily wheat and other cereals), along with extensive sheep grazing

on the plains. Some grazing of goats and camels on more marginal pastures occurs before they move towards the desert, which ends up dominating the landscape found between Sheberghan and adjacent towns. Besides natural gas, Sheberghan also contains deposits of salt and coal.

53) Crucially, the communication network is Sheberghan is good. Both cellular networks in Afghanistan have city-wide coverage, whereas the local television station is operated by broadcasts in Pashto, Uzbek, Dari, and Turkmen languages through a communications tower situated atop the hill at Yatimtaq.

a. Socio-Economic Profile of the completed segment

54) The constructed portion of 44 km of pipeline only affects 8 families in Mir Qasim village and the rest of the completed section is passing through barren lands which is free of any settlements, according to the baseline social survey/Arazi-land clearance report. The table below provides demographic information of the villages along the gas pipeline. The baseline information indicates there are 800 families reside in Mir Qasim village. According to the AGE information, most of the inhabitants are ethnic Arab, with minor Tajik and as well Pashtun inhabitants.

- **Employment and livelihood information**: Small-scale agriculture and livestock raising are the main economic sectors followed by remittances from wage labor conducted in other parts of the country. In the area, there are also lime sulfur factories and agricultural food processing plants which offer employment opportunities. Locally, a small operating lime production factory is operating some 80 meters away from the pipeline; some of the residents from this village are working in this factory. It is essential to notice that the project activities have no impact on this factory.
- **Agriculture**: Mir Qasim village has both irrigated and rain-fed lands with an average size of irrigated land a family owns is 2 jerib (2,000 m2). The average of rain-fed land a family owns is five jerib (10,000 m2).
- **Livestock**: Main livestock are sheep, followed by milk cow and camels, some families also keep horse and donkey for transportation purposes. Cattles make the most significant amount of the livestock; it is mainly dependent on the pasture, including the pasture that has been disturbed by the pipeline construction. It is essential to notice that the completed gas pipeline will be buried under the ground and the depth of the trench is 1.8 m (0.8 meters wide). But, currently there are sufficient access points available for local communities to access grazing land.
- Mir Qasim village is connected by a tarred road with the provincial capital. Main source of energy for cooking and heating is animal dung followed by wood.

a. Baseline Socio-economic Survey

55) The USAID through consulting firm conducted socio-economic survey of the villages along the full length of the gas-pipeline in 2016. There are five villages (including Mir Qasim) located along the completed and remining segments of the gas-pipeline. the table below contains information about population size and ethnicity of the villages. The original household survey by USAID covered a total 140 families out of 1710 randomly chosen covering more than 8 percent of the total population in the targeted five villages, including Mir Qasim village. This village is the only village located within the completed segment of 44 km.

Table 3: Population and ethnic information along the completed and remining segments

No	Name of village	Number of families	Ethnic groups	Land with Titleholder	Remarks
1	Mir Qasim	800 families	Arab, Tajik and some Pashtun	There are mix kind of land tenure exist.	
2	Sar-e-Aisa	600 families	Arab	No (mention area is Public land)	
3	Zawli (Paliz-e-Hawili)	80 families	Hazara	No (mention area is Public land)	
4	Aseya e Sharaf	150 families	Tajik	No (mention area is Public land)	
5	Bar gah	80 families	NA	No (mention area is Public land)	
	Total	1710			

56) According to USAID survey, nearly 21% of the respondents were female while the remaining ones were male. There was just one household that was headed by a woman. Among those who addressed this survey, just 35% could read or write a simple message. Of all respondents, graduates of at least high school accounted for 17%. It was found that the most common occupation of the household head was a government employee or official (23%). Private employees (22%) and farmers (21%) were among the more prominent respondents. According to 14% of all respondents, they did not have any job. Similarly, 17% were accounted for by laborers, small traders, retired or people of other occupations.

57) More than 80% earn less than USD 1 on daily basis per capita. According to the survey, 96% of these respondents resides in homes built from mud-brick, whereas 92% were owners of their own house.

58) Despite the large size of houses, approximately 58.6% of households are depended on a single income earner. Meanwhile 22% and 18% were shown to have two three, four, or five income earners. According to 10% of the respondents, their house included some form of business, primarily manufacture of crafts. Meanwhile the average yearly household income stands at USD 1,465 translating into a household income of just USD 4 per day. Meanwhile 52% of the surveyed homes had an outstanding loan, which was largely (71%) taken to purchase food.

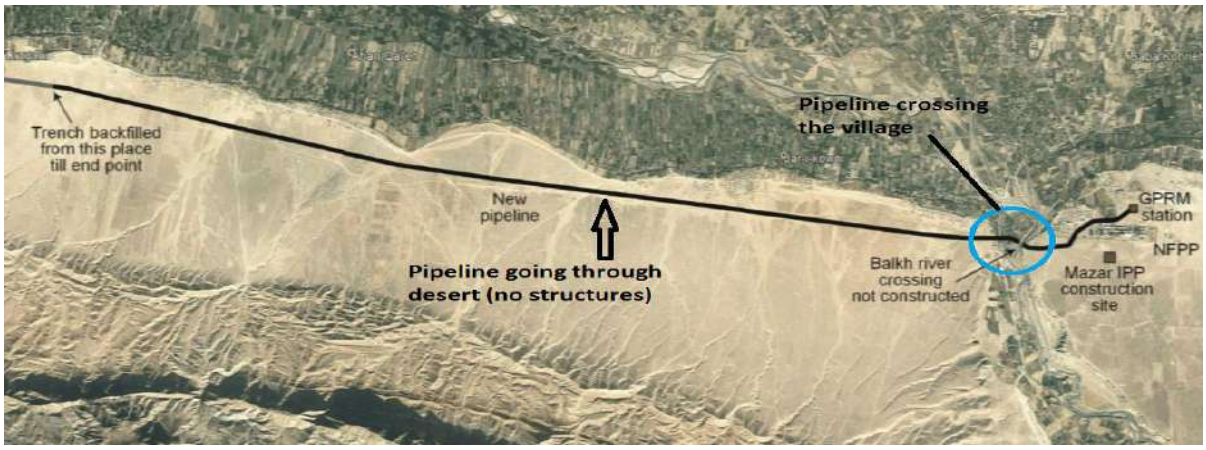
59) Asides from this, AGE conducted consultation sessions with communities from Mir Qasim village (including CDCs and PAPs) during socio-economic survey in 2018. Meanwhile, public consultation with CDCs in Mir Qasim village, the members have suggestion regarding provision of employment opportunities for local people. Details of these consultations are given in Appendix 2.

a. Land Tenure & Use

60) The gas pipeline passes mostly through pasture land which is commonly used by local population for grazing purposes. The map below shows land use of the gas pipeline. the constructed portion of 44 km of pipeline only affects eight families in Mir Qasim village and the rest of the completed section is

passing through barren lands which is free of any settlements, according to the baseline social survey and Arazi-land clearance report.

The map below shows the gas-pipeline route- impacting Mir Qasim village (Blue Circle)



61) No current or planned environmental/cultural protected areas are found within or near the gas fields as well as along the pipeline corridor. According to AGE representative it is a public land that was occupied by these people for around 27 years. Documentation (land deed) does not exist. But the villagers said they have been living there for the past 40 years.

62) **Pasture land**- All along the pipeline there is pasture land that is easily accessible to the communities. Although the amount of pasture destroyed is not large, but it is important because of its access to community land. Along the pipeline, in average, 7meter of pasture land has been destroyed. And most of this destruction is temporary.

63) During consultation with CDC, local representatives raised their concern about their access to the adjacent grazing land. They added that the pipeline activities temporarily restrict local access to the pasture. However, in consultation with local communities, there are enough access points provided for local communities and their cattle to smoothly provide access to the grazing land. It is essential to notice that the completed gas pipeline will be buried under the ground and the depth of the trench is 1.8 m (0.8 meters wide). Once backfilling activities are completed, full access to the pasture will be restored.

64) Overall land tenure of project surrounding communities along the gas pipeline is as follows:

- Court official document;
- Taxation document;
- the water right document'
- The land official ownership document;
- The land ownership document (Sharia deed);
- Unofficial document (custom document); and
- Ezafa Jaribi- additional land.

65) It is important to notice that none of the 8 project affected families falls under the above categories. According to AGE information, the affected families have occupied state land for 27 years, for which

they have no land ownership document.

a. Gender Integration

66) Consultations were made with women's CDCs during baseline data collection, including separate consultations were conducted with affected families (male and female). The purpose of the consultations was to get women feedbacks about this gas-pipeline project. Also, it aims to understand their concerns about this project, including their view about GBV and SEA risks and labor issues. The overall GBV risk for AGASP is determined to be moderate risk. However, the GBV risk and other labor influx risks associated with this gas pipeline is likely to be minor as contractor will mostly rely to engage labor from the surrounding villages- only a limited number of skilled labors/ technical staff will be engaged from outside the project's area of influence. The OESMP include measures for GBV risk prevention which will be applied. In addition, the OESMP contains code-of-conduct will which will be signed by each labor prior to their engagement.

67) The AGE female staff will conduct further consultation with female population during project implementation.

68) PIU is in the process to engage a gender expert who will extend their gender related support to AGE and contractor (including GRC of the gas pipeline).

69) There is a sub-project GRC established which also comprises members of female CDCs. The female members will regularly meet with the local female population to collect their view and concerns relating to the project activities. The ESA outlines a GRM system for both male and female.

70) Environmental and Social Risks and Impacts

a. Environmental, Social, Operations, Health and Safety (OHS) Risks and Impacts

71) On January 19, 2019, the Consultant's team visited the project-specific gas fields as well as the gas-pipeline's constructed sections spanning an area of 7 km from Khoja Gurduruk compressor station, in addition to other sections within the Sheberghan area to conclude the investigation of environmental, social, health and safety and technical aspects concerning the development of natural gas fired plants as well as transmission services by building and rehabilitating the requisite infrastructure. The gas-pipeline and related facilities are situated at a remote distance from all localities, although the gas-pipeline runs in vicinity of one village at some 22 km distance from Mazar IPP. The key environmental, social and OHS risks and impacts of the gas pipeline activities are summarized below.

a. Primary Construction Impacts of the Gas-pipeline

72) The primary impacts that have been identified during the construction of the 44 km of the gas pipeline include:

- Dust emissions owing to construction-related on-site works (site preparation, excavation, traffic, etc.): no complaints were received;
- The aquatic environment could possibly be affected due to inappropriate disposal of construction debris in the waterways (Balkh River), and unsatisfactory disposal of sanitary wastewater and

water stemming from hydrostatic testing or a potential oil spill: no incidents happened;

- The entire project area is very poor in terrestrial and aquatic biodiversity and impacts on biodiversity have been assessed as minimal;
- Increased noise level caused by the construction equipment, traffic, excavation works related to construction: no complaints were received;
- The possible impact on current existing infrastructure such as water/wastewater networks and pipes: no impacts were identified;
- Management of varying waste types, including hazardous (e.g. waste oils), domestic, as well as construction waste, including concrete, soil, welding belts, beginning from their storage onsite until their disposal: waste management practices could be improved;
- Occupational health and safety: no serious accidents occurred;
- Natural disasters which might delay the schedule of activities, e.g. earthquakes: no natural disaster occurred;
- Traffic impacts and risks of accidents due to an increased number of trucks transporting construction equipment and materials to the construction site: no accidents occurred;
- Land Acquisition: 8 PAPs lost a small portion of their land;
- Blocking access of local people to their pastures: this happened and was resolved;
- Cultural Heritage. No effect on cultural heritage has been identified either. A "Chance find procedure" will be included in all future Contractor Contracts;
- Projects in Disputed Areas. No disputed areas are situated within the project area;
- GBV and SEA risk: in consultation with CDC members (male and female) in the completed segment of 44km, no evidence/complaint were raised about GBV and SEA issues;
- Labor influx risk: AGE had engaged a small team of their technical staff from outside the project's area of influence with some unskilled labors locally recruited- the overall labor influx risk was low. AGE received no complaint about labor influx issue during the construction of the completed segment;
- Worker's Camp risks: no only a small team of technical staff were residing in the camp- AGE received no complaint during the construction period;
- Public Health and HIV/AIDs risks: there is no available evidence about these risks in the project area, as nobody is ready to disclose such information because of cultural issues.

a. Primary Operation Impacts of the Gas-pipeline

73) The new gas-pipeline is not yet operational as only a 44km segment has been constructed to-date. The primary impacts that are anticipated during operation, once the entire pipeline is in place and operational are:

- Gas-pipeline failure caused by accidents sabotage, maintenance activities, or trespassing may facilitate the release of a considerable amount of natural gas this, in turn, can be hazardous for the surrounding communities, is a safety concern and be hazardous to the environment at large;
- A possible gas leakage or fire/explosion, which might affect the residents living within the area, is a matter of safety concern;
- Impacts pertaining to the easement of the RoW: encroachment needs to be monitored by the project proponent; possible extension of the residential area near the pipe line right-of-way should be prohibited. The land of the right-of-way should be prohibited from being used for construction or as an urban area. This is deemed as a negative impact on the land owners;
- There is also a possibility of additional crop damage caused as a result of maintenance or surveillance activities;

- Natural disasters could result in gas-line failure and could have significant impacts on local communities;
- An accident with the extraction of natural gas could have a significant impact on local people, which would jeopardize the health of surrounding communities as well as the environment; and
- The operation activities are also likely to cause temporary land/asset impacts- the OESMP will include measures for compensation to the affected families.

74) In addition to those identified above, other project components include:

- Existing and future stockyard piles and lay-down areas need to be adequately managed;
- At construction sites relating to civil engineering structures, such as crossings, valves etc., health and safety needs to adequately taken care off.

a. Primary Decommissioning Impacts of the Gas-pipeline

75) The primary impacts of decommissioning will be similar as the impacts from construction. The impacts might be lower, since likely more stringent standards will be applied. Likely the existing gas pipeline will be left in place after the gas pipeline has been cleaned, remaining gas released and poses no safety risks to nearby communities.

a. Identified Social risks and impacts during the construction period

76) The key identified adverse social risks and impacts during the past construction phase included: (a) land/asset impacts and resettlement impact- there are already 8 affected families identified in the completed section (44km), (b) temporary interruption of access to the pasture land for local population, (c) limited labor influx risks, as AGE had engaged some skilled labors from outside the project's area of influence, (d) GBV risks (including workplace sexual harassment (WSH) and Sexual Exploitation and Abuse (SEA)). The pipeline can also cause safety risks during the operation stage. The project activities in the completed segment did not impact any irrigation structures or other private and public structures.

The gas-pipeline did not cross any major roads. As of the date of preparing this report, the Consultant could not witness the deployment of the road crossing construction method. The road crossing methodology which was deployed to cross minor roads was an open-cut method that makes use of a casing pipe inside the excavated trench.

77) A more elaborative elucidation of the gas-pipeline corridor is provided in the appended travel reports. In the subsequent section, an elaboration of the environment and social profile of project sites has been provided.

a. Temporary and Permanent land acquisition Impacts

78) In this section below, a summarized description of land acquisition impacts, both temporary and permanent during recent construction of the gas-pipeline (44 km) has been provided. A more descriptive presentation of such impacts follows below.

Permanent impacts:

- A total of 4768 m^2 agricultural land has been affected and permanently out of use for reason of pipeline construction activities and the right-of-way for the gas pipeline. The pipeline transverses the land parallel with the access road, leaving a 3 m strip between the pipeline and the road, whereby this land is permanently out of use. Impacts are permanent and includes the loss of this year harvest on the land.
- Total of 1894 m^2 residential land has been affected.
- Total 6 residential structures partially affected, 111 m^2 in size.
- Two boundary walls with a total length of 125 m and 3m height
- Total 9 trees (3-fruit bearing and 6 non-fruit trees).

Temporary impact: Nil

79) There is a stand-alone Ex-Post Social Audit (EPSA) in place for the completed segment of 44 km that includes detailed information about all affected families with information about the affected land parcels and structures.

Pictures below show the pipeline passing through the private properties

80) The project has significantly affected the environment in terms of surface vegetation removal. In average, 7m of the surface (vegetation) has been removed by the bulldozer work, during backfilling of the tranche. According to local authorities, there will be economic impacts on the residents, in addition to environmental impacts. Although the impact is not significant, but it has destroyed a piece of pasture. From the observation it seems that the pasture in many places has permanently been destroyed. The cutting of the surface vegetation has significantly reduced the possibility of re-vegetation, because the new surface material is a mix of gravel and sand and has a very low percentage of top soil.

81) According to local community, the trench has had temporary impacts on the life of the communities, as it had cut the way of the flocks to access the main pasture. But this impact has been removed by the backfilling of the trench. To ensure smooth passage of humans and animals during the construction phase, an agreement with CDC and other local representatives has been made to provide enough access points along the completed segments.

82) We noticed that at a location with the coordinates (latitude N 36 38 11.364 (36.636490) longitude E 66 55 27.846001 (66.924402) in the proximity of the gas pipeline a water pipeline is used as a bridge across local water channel. We assume that this bridge is used by local workers engaged in hydrating lime.

a. Vulnerable and Disadvantaged People within the completed segment

83) The key vulnerable groups in the completed segment include: (1) female headed households- one of such families is directly affected by this project, (ii) Persons with disabilities, (iii) returnees and IDPs, some families are displaced due to insecurity and drought, (iv) unemployed among youths.

84) Separate consultations were conducted with female CDCs, including youths and female headed-households. One of their major demand was to provide them with more employment opportunities in the project. AGE, IPPs, and the gas companies will share project benefits with the local communities, especially vulnerable and disadvantaged people in the project area. They will need to identify those labor opportunities where these vulnerable groups could be involved for sharing project benefits with local communities, including vulnerable and disadvantaged people from the completed segment. The OESMP include measures to prioritize vulnerable groups in provision of employment opportunities under the project. There should also be consultation with vulnerable groups throughout the project implementation and construction works. There is also a GRM in place which is accessible to address concerns by vulnerable groups.

85) **Gully erosion:** The Consultant witnessed occurrence of washed out sections of the pipeline due to gully erosion as indicated at photographs below. Under natural conditions, run-off is moderated by vegetation which generally holds the soil together, protecting it from excessive run-off and direct rainfall. Inappropriate land use and compaction of the soil caused by grazing often means the soil is left exposed and unable to absorb excess water. Gully erosion may cause unwanted negative impact during the operation phase of the pipeline and appropriate mitigation measure are required as part of the OESMP.

a. Environmental, Social, Health and Safety Risks and Impacts Rating

86) The matrix below depicts the direct impacts and potential indirect impacts. Cumulative impacts are minor or non-existent, for example, the joint noise of pipeline construction, railways and road traffic or air quality caused by past pipeline construction trucks and road traffic.

87) In addition, the pipeline past construction impacts were temporary. All past construction and operation environmental and social impacts are rated as low to medium with the exception in the case of natural disaster during the operational phase, which is rated high.

Table 04: Environmental, Social, Health and Safety Risks and Impacts Rating

Phase	Impact Category	Impact Rating		
		Low	Medium	High
Construction	Air Quality		X	
	Noise	x		
	Ecological systems	x		
	Land use		X	
	Soil (gully erosion)		X	
	Traffic		X	
	Archaeological Sites	x		
	Natural disasters	x		
	Hazards	x		
	Waste disposal	x		
	Public health	x		
	Health and safety		X	
	Crop Damage		X	
Operation	Air Quality		X	
	Noise	x		
	Ecological systems	x		
	Land use	x		
	Soil (gully erosion)		X	
	Traffic	x		
	Archaeological Sites	x		
	Natural disasters			x
	Hazards		X	
	Waste disposal	x		
	Public health	x		
	Health and safety		X	
	Crop damage	x		

88) The envisioned potential environmental impacts and risks of the past construction and of the construction of the next segment unfolds in two distinct stages: (i) past construction stage – where both risks and impacts were connected with the way construction activities were managed, as well as the management of equipment and staff, such as dust, noise, inter alia, and health and safety concerns for the neighboring communities; and (ii) operations stage – impacts and risks are expected to be linked to health and safety concerns around gas leaks with regard to air quality and the hazards of a fire explosion and air emissions, as well as erosion risks.

89) Stakeholder Consultation

90) AGE and PIU conducted separate consultations meetings with all affected families in Mir Qasim village (including the female headed family) in the completed section (44km) during their initial socio-economic survey in 2018-2019. Also, there were public consultations conducted with CDCs and other stakeholder, such as local and provincial authorities (including central AILA-Arazi and NEPA officials) linked to land acquisition, social and environmental issues.

91) Public notification notes were issued to the affected families in Mir Qasim village about land tasfiya (clearance) process. There were also public posters distributed to the affected community in Mir Qasim to inform them about construction activities of the completed gas pipeline.

92) Consultations were also conducted with communities (including CDCs and PAPs) during socio-economic survey by AGE, which were conducted in 2018.

93) The Social Grievance Redress Committee was also established at the community and project levels. The committee members are from PAPs, District government, community leader, ARAZI and other local stockholders.

94) At the time of the public consultation with the CDCs in Mir Qasim village, the members requested employment opportunities for local people.

95) During these consultation meetings the following information was shared with the local population, affected people, CDC members and other vulnerable groups.

- The purpose and nature of the gas pipeline project and its duration
- Potential risks and impacts of the project on local population, mitigation strategies, and identification of disadvantaged and vulnerable groups
- Stakeholder engagement mechanism and possible ways in which stakeholders can participate
- The time and venue of the public consultation and how their feedback would be reflected into project related decision-making process and the process of grievance redressing.
- Explain to the public about project salient features and compensation mechanisms for loss of their lands, trees and properties
- To obtain qualitative as well as quantitative information on viable income generation and livelihood interventions which potential affected persons could engage themselves in order to restore their income and livelihoods in a self-sustaining manner.
- To inform local authorities of the impacts and the cut-off date, solicit their views on the project and discuss their share of the responsibility for the smooth functioning of the overall project operations.

96) Throughout the consultation process it was found that majority of the local population were eager to see such developmental projects in their areas. They promised their full support towards this project and asked the MoMP/contractor to provide employment opportunities for the local people. Therefore, based on mutual agreement with the local communities, MoMP and the project company agreed to recruit most of the unskilled workers from local communities. Also, provisions were made in the ESMP to recruit unskilled workers from the local communities.

97) Separate meetings with the women PAPs conducted along the gas-pipeline project. During the consultations, gender assistant of the project has explained and disclose the project salient features, land acquisition, resettlement, compensation process and the benefits of the project. In the meetings, women were asked to state their views, opinions and concerns about the project. The team has received their valuable feedbacks, suggestion, their needs, concerns and their satisfaction, which have been recorded.

98) Public consultations with stakeholders have already been undertaken and additional ones are planned when safety allows it. The additional public consultations with stakeholders and the affected community will be carried out at feasible locations, with each session

encompassing around 12- 20 people out of which at least five will include female participants. In addition, information leaflets would be prepared as well as presented during each occasion of public consultation to elicit the participation of all kinds of people.

99) The public consultations are aimed at informing the affected individuals and community with regard to the project design; construction; operation and maintenance system; mitigation measures; resettlement and land acquisition impacts and compensation at replacement value; Grievance Redress Mechanism (GRM); as well as potential benefits for not just local people, but also national economy. Please refer to Appendix 2 for Stakeholders Consultation.

100) Operation Environmental and Social Management and Monitoring Plan (OESMP)

a. Introduction

101) The following Operation Environmental and Social Management Plan (OESMP) is prepared to outline the types of control measures that must be implemented to reduce environmental and social risks during gas-pipeline operation decommissioning. The potential risks were identified during the risk assessment process. The mitigation measures identified during that process are listed as specific commitments to direct performance criteria within the OESMP.[1]The objective of the OESMP is to ensure that all identified environmental and social risks expected to occur during the operation stages are reduced to an acceptable level. This will be achieved through engagement of all relevant parties in environmental and social management. The requirements of this plan are applicable to all on-site work carried out. The O&M contractors will be bound to comply with the requirements of this plan, in so far as they are applicable to the nature and scope of their work.

102) AGE/MoMP- PIU along with the Contractor will be responsible for ensuring implementation of the OESMP. The AGE site supervisor will be responsible for ensuring appropriate corrective action is taken by the Contractors for any failure to implement required mitigation measures during the operation and decommissioning phase. Where contractual agreements are entered into for work associated with this project, MoMP- PIU will:

- include the OESMP in contract documents for all work to be undertaken by the contractors
- ensure that the contractors comply with the requirements of the OESMP.

103) The success of the OESMP depends on all those responsible for implementation and review being thoroughly conversant with its contents, interpretation and performance measurements. MoMP- PIU and its contractor will be responsible for ensuring that project personnel have enough knowledge and awareness to identify potential environmental and social issues, and that they are trained to take appropriate corrective action. It is important that all personnel are familiar with the procedures for reporting on issues that may result in increased environmental or social risks. This includes informing key personnel within AGE and MoMP-PIU.

a. Environmental and Social Management

104) The study identifies environmental and social risks arising during the operation and decommission phases of the gas-pipeline works. The table below provides guidance to relevant parties for implementation of the mitigation measures under the project.

Table 5 – Implementation of Mitigation Measures – Social Impacts

Potential Impacts	Mitigation Measures	Implementation Responsivities
Land Acquisition- the activities have already affected private land/assets;	A stand-alone Ex-Post Social Audit (EPSA) is developed that contains compensation details to the affected families.	Govt of Afghanistan will be responsible to pay compensation to the affected families. The compensation payment will be paid prior to negotiations for AGASP.
Blocking access of local people to their pastures;	This impact has been addressed by the backfilling the trench in possible	Contractor/AGE

	earlier opportunity. To ensure smooth passage of humans and animals during the construction phase, there should be enough access points along the completed segments provided.	
Cultural Heritage impacts;	No effect on cultural heritage has been identified either. A "Chance find procedure" will be included in OESMP.	Contractor to develop and adequately implement OESMP which will be subject to review by AGE/MoMP and the WB.
GBV and SEA risk;	• AGE/MoMP will keep communities informed about project activities and GBV and SEA related issues; • Make certain the availability of an **effective grievance redress mechanism (GRM)** with multiple channels to initiate a complaint • Clearly define the GBV requirements and expectations in the **bid documents;** • Define the requirements to be included in the bidding documents for a **Code of Conduct (CoC) which addresses GBV and SEA (for ICB and NCB);** • The procurement documents should set out clearly **how adequate GBV and SEA costs will be paid for in the contract;** • During implementation, ensure that CoCs are signed and understood by all contractor and consultant staff. Training should be carried out. • During works, separate facilities for women & men, GBV-free zone signage. • **The social expert will be trained** in the supervision of GBV and SEA **risks.** • **Evaluate the contractor's GBV and SEA response proposal** in the O-ESMP and confirm prior to finalizing the contract the contractor's ability to meet the project's GBV and SEA requirements.	MoMP and contractor

Labor influx risk (including worker's Camp risks) as contractor will engage some skilled labor and technical staff from outside the project's area of influence who will reside in the labor camp;	The OESMP include code of conduct which needs to be signed by each laborer prior to engage in the construction works.	MoMP/AGE

105) The sections below provide guidance to relevant parties for implementation of the environmental mitigation measures under the project during the operation and decommissioning phases:

a) Operation phase

- O&M prepares and implements an Operational ESMP (OESMP), an Emergency Preparedness and Response Plan and an OHS Plan in compliance with international standards. O&M recruits experienced and qualified E&S specialists and OHSAS 18001:2007, NEBOSH or similarly certified OHS specialists.
- Environmental issues to be managed include prevention of encroachment on right-of-way, soil erosion monitoring and management, monitoring of invasive alien flora species and removal, air emissions quality monitoring, ambient air monitoring, leakage control, waste management, surface and groundwater quality monitoring, health and safety monitoring.
- A fatality or a serious accident needs to be reported within 24 hours to the World Bank.

b) Decommissioning phase

- The Decommissioning Contractor prepares and implements a Decommissioning ESMP (DESMP) and an OHS Plan based on international standards and in compliance with World Bank ESF and Afghan legislation.

Table 6: Environmental, Occupational, Health and Safety (OHS) Management and Monitoring Plans for Operation and Decommissioning

Measures and Actions to Mitigate the Project's Environmental, Social, Health and Safety Risks and Impacts		Timeframe	Responsibility
1	**REGULAR REPORTING TO WORLD BANK**: Prepare and submit regular monitoring reports on the implementation of the OESMP and Occupational Health and Safety Plan (OHS).	Semi-annually	AGE ESU/MoF/MoMP
2	**BIDDING DOCUMENTS AND CONTRACTOR CONTRACT:** AGE includes ESMP in bidding documents and in O&M Contractor and Owner's Engineer Contracts.	Prior to launching bidding documents and prior to signing Contracts	AGE ESU/MoF/MoMP
3	**O&M CONTRACOR REPORTS TO AGE ESU**	Monthly	O&M Contractor
4	**INCIDENTS AND ACCIDENTS NOTIFICATION**: Promptly notify any incident or accident related or having an impact on the Project which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers including environmental and social related field that requires assessment. Provide enough detail regarding the incident or accident, indicating immediate	Promptly within 24 hours after taking notice of the incident or accident.	O&M Contractor, AGE ESU/O&M /MoMP/MoF

Measures and Actions to Mitigate the Project's Environmental, Social, Health and Safety Risks and Impacts		Timeframe	Responsibility
	measures taken to address it, and include information provided by any contractor and supervising entity, as appropriate.		
5	**ENVIRONMENTAL, SOCIAL, HEALTH AND SAFETY REPORTS (ESHS Report)**: Prepare and submit ESHS summary report.	Annually	AGE/MoMP/ MoF
6	**ORGANIZATIONAL STRUCTURE**: AGE establishes an Environmental and Social Unit (ESU) with qualified and experienced E&S and certified OHSAS 18001:2007, NEBOSH or similar OHS staff to support preparation and implementation of Operation ESMP (OESMP), Decommissioning ESMP (DESMP) and Operation and Decommissioning OHS Plans, as well as an Emergency Preparedness Response Plan.	Prior to start of operation and prior to start of decommissioning	AGE
7	**O&M CONTRACTOR RECRUITS QUALIFIED AND EXPERIENCED E&S STAFF AND OHSAS 18001:2007, NEBOSH OR SIMILAR CERTIFIED OHS PERSONNEL:** O&M Contractor prepares and implements OESMP and OHS Plan.	Prior to start construction	Contractor/ Owner's Engineer/AGE ESU
8	**MANAGEMENT TOOLS AND INSTRUMENTS:** Develop timeline for finalization of individual management plans identified in the OESMP and DESMP, based on the planned sequence of operation and decommissioning activities. Develop individual management plans in accordance with the approved timeline and update as needed. The following plans will be prepared: • Work camp and Lay down management plan • Emergency preparedness response plan • Site rehabilitation plan • Air, soil and water quality management plans, including erosion management plan • Waste and hazardous materials management plan • Transport management plan • Explosives management plan • Noise and vibration management plan • Biodiversity survey plan	Prior to operation and prior to decommissioning	Contractor/ /AGE ESU.
9	**OHS:** Develop and implement procedures for managing environmental and social performance and occupational health and safety (OHS) during operation and decommissioning.	Prior to operation and decommissioning	Contractor/Owner's Engineer/AGE ESU
10	**PERMIT, CONSENTS AND AUTHORIZATIONS**: Obtain operation permits or authorizations from relevant authorities to • Operate the gas pipeline, • Disposal and management of hazardous wastes.	3 months Prior to initiating operation activities.	O&M /AGE ESU.
11	**THIRD PARTY MONITORING***:* According to the SEP it has been agreed that a stakeholder or third parties will be engaged to complement and verify the monitoring of environmental and social, as well as the health and safety risks and impacts of the Project, during operation and decommissioning, such as: • Employee and Community Health and Safety;	Annual basis during operation and decommissioning	Third Party who should be a certified Auditor /AGE ESU/O&M.

Measures and Actions to Mitigate the Project's Environmental, Social, Health and Safety Risks and Impacts		Timeframe	Responsibility
	• Noise pollution management; • Air and water quality management; • Biodiversity; • Waste and hazardous materials management		
12	**DEVELOP AND IMPLEMENT PROCEDURES FOR SUB CONTRACTOR:** Develop and implement procedures: • for managing sub-contractors, including requirements to include appropriate OESMP and Operation and Decommissioning OHS requirements in contracts and subcontracts • for monitoring compliance by contractors with their contractual commitments • for overseeing implementation of relevant OESMP and OHS requirements.	Include in contracts of sub-contractors.	Contractors/ Owner's Engineer/AGE ESU/O&M.
13	**LABOR MANAGEMENT PLAN (LMP)**: Prepare labor management plan consistent with national law and ESS2, and ensure they are available to all project workers. Labor management plan should address all issues identified in ESS2, including the applicable requirements regarding non-discrimination and equal opportunity to all stratum of the communities.	Prior to performing work	Contractors/ Owner's Engineer/AGE ESU/MoF
14	**GRIEVANCE REDRESS MECHANISM (GRM) FOR PROJECT WORKERS:** Develop, implement and maintain a grievance mechanism for Project workers.	Prior to commencing works.	Contractors/ Owner Engineer/AGE ESU/MOF
15	**OHS MEASURES**: Develop and implement occupational, health and safety (OHS) measures and recruit certified staff. The contractors are required to develop and implement OHS plans or comply with main Project OHS Plan. Plan requirements to include (but not be limited to): • Safety training for all personnel in their language, covering hazards and safety protocols of their jobs • Job- and task-specific hazard analysis and controls for all activities • Adequately mark construction sites • Provision of personal protection equipment (PPE), requirements for use of PPE, and enforcement of PPE use • Recording incident statistics, including total work hours, lost time incidents, major injuries, fatalities, etc. • Oversight of OHS implementation, including mandatory reporting.	Prior to operation and decommissioning, prepare and implement the respective OHS plans	Contractor/ Owner's Engineer/ AGE ESU / MoF
16	**EMERGENCY PREPAREDNESS RESPONSE**: As part of the OHS measures specified in 2.3, include measures on emergency preparedness response for: • Operation period and • Decommissioning period.	Plan 3 months prior to operation and decommissioning periods. Workers will be trained prior to	Contractors/ Owner's Engineer/ AGE ESU

Measures and Actions to Mitigate the Project's Environmental, Social, Health and Safety Risks and Impacts		Timeframe	Responsibility
	Ensure workers and contractors are trained. Implement the plan as needed.	commencing the project work	
17	**PROJECT WORKERS TRAINING**: Implement training of Project Workers designed to heighten awareness of risks and to mitigate impacts on local communities.	Training conducted prior to initiating operation and decommissioning, with regular refresher training	Contractor/ Owner Engineer/ AGE ESU
18	**TERMS AND CONDITION OF EMPLOYMENT:** Prepare information regarding terms and conditions of employment to be provided to project workers at the beginning of the working relationship and ensure that project worker is aware of information.	Develop and disseminate prior to engagement of project worker	Contractor/ Owner's Engineer/AGE ESU/O&M.
19	**MANAGEMENT OF WASTE AND HAZARDOUS MATERIALS:** Develop and implement measures and actions to manage waste and hazardous materials, manage all wastes and hazardous materials in accordance with approved plans and restore and stabilize all disturbed areas with revegetation etc. for permanent erosion control, with preference for grass/vegetation cover. Implement remedial plans to address contamination and other issues identified in the audit of existing construction activities and site, and to improve management practices for wastes, hazardous materials, etc.	Develop plan prior to operation and decommissioning and implement plans throughout operation and decommissioning until all sites are cleaned, rehabilitated, stable and vegetated.	Contractors/ Owner's Engineer/AGE ESU
20	**EROSION CONTROL AND SITE STABILIZATION PLANS:** Finalize and implement erosion control and site stabilization plans for implementation by O&M and decommissioning contractors to include at a minimum: • Topsoil salvage, storage, and reuse for restoration • Stable storage and disposal of excavated material or fill material • Drainage control designed into roads and other permanent features • Restore and stabilize all disturbed areas with revegetation etc. for permanent erosion control, with preference for grass/vegetation cover.	Plans will be implemented continually until complete	Contractor/ Owner's Engineer/AGE ESU
21	**AIR QUALITY MANAGEMENT PLANS FOR GAS PIPELINE:** Finalize air quality management plans for operation and decommissioning, including controlling, and requiring contractors to control, emissions of dust and other air pollutants by: • Water sprays or other means to reduce dust generation in dry weather • Vehicle and equipment maintenance • Site restoration as soon as practicable after construction ends • Monitor ambient air quality.	Finalize plan before operation and decommissioning starts Implement controls throughout operation and decommissioning	Contractors/ Owner's Engineer/AGE ESU.

Measures and Actions to Mitigate the Project's Environmental, Social, Health and Safety Risks and Impacts		Timeframe	Responsibility
22	**EXPLOSIVE MANAGEMENT PLAN:** Develop and implement explosive management plan to minimize risks from transportation, storage and use of explosives	Finalize plan before operation starts Implement controls throughout operation	O&M/AGE ESU.
23	**TRAFFIC AND ROAD SAFETY:** Develop and implement a road safety management plan to address the impacts on local communities of moving construction equipment and the transport of workers to the site.	Plan prior to start of operation and decommissioning. Maintained throughout life time of project.	Contractors/ Owner's Engineer/AGE ESU.
24	**COMMUNITY HEALTH AND SAFETY:** Develop and implement measures and action to assess and manage specific risks and impacts to the community arising from Project activities, including in relation to Project Workers and any risks of labor influx.	Plans prior to initiating operation and decommissioning and implemented throughout life time of project.	Contractors/ Owner's Engineer/AGE ESU.
25	**GBV AND SEA ACTION PLAN:** Develop and implement measures and action Plan to assess and manage the risks of gender-based violence (GBV) and sexual exploitation and abuse (SEA).	Plan Prior to initiating construction.	Contractor/ Owner's Engineer/AGE ESU.
26	**GBV AND SEA RISKS DURING PROJECT IMPLEMENTATION:** Specify additional funds available to implement measures to address GBV and SEA risks and impacts that may arise during the gas pipeline operation and decommissioning.	Plan Prior to initiating operation and decommissioning.	Contractors/ Owner's Engineer/AGE ESU
27	**CODE OF CONDUCT:** All workers have to sign a Code of Conduct which prohibits GBV, SEA, child labor, forced labor, discrimination based on race, religion, gender, etc.	At the time of signing labor contract.	Contractors/ Owner's Engineer/AGE ESU
28	**EMERGENCY RESPONSE MEASURES:** Develop and Implement Emergency Response Plan for operation and decommissioning based on the Risk Hazard Assessment, Review and update plan based on experience.	Plan prior to operation and decommissioning. Review and update at least annually throughout life time of project.	Contractors/ Owner's Engineer/AGE ESU
29	**TRAINING SECURITY PERSONNEL:** Train Project security personnel adequately in the use of force and firearms, and appropriate conduct toward workers and affected communities; and require them to act within the applicable law, to well manage the risks to human security of project-affected communities and project workers that could arise from the use of security personnel. Security protocol should cover the code of conduct.	Plans prior engaging security personnel Implement throughout operation and decommissioning	Contractors/ Owner's Engineer/AGE ESU
30	**ORIENTATION FOR THE COMMUNITY:** Conduct orientation for the community designed to heighten awareness of risks and to mitigate impacts specified in this section.	Communities training prior to local work, Enforcement throughout operation and decommissioning	Contractors/ Owner's Engineer/AGE ESU

Measures and Actions to Mitigate the Project's Environmental, Social, Health and Safety Risks and Impacts		Timeframe	Responsibility
31	**TRAINING FOR THE WORKERS:** Train workers as to how they interact with local communities, and enforce requirements so as to minimize disruption on local communities created by workers.	Prior to local work, with annual refresher training.	Contractors/ Owner's Engineer/AGE ESU
32	**CLOSE RELATION WITH LOCAL AUTHORITIES:** Develop and implement program to work with local authorities to build institutional and infrastructure capacity to deal with issues (housing, disease, health care, etc.) arising from influx of workers and others.	Meeting prior to local work, conducting training.	Contractors/ Owner's Engineer/AGE ESU
33	**Remedial Management Plan FOR GAS PIPELINE**: Develop and implement prior to project negotiations.	Prior to undertaking Project activities	MoMPMoMP/ AGE ESU/MoFMoF
34	**OPERATION ESMP (OESMP) and Decommissioning ESMP (DESMP):** Operation and Decommissioning Contractors prepare and implement an OESMP and DESMP for the Gas Pipeline Project.	Prior to undertaking Project activities. Disclose in-country and on the World Bank website after approval.	Operation and Decommissioning Contractors/ AGE ESU
35	**GRIEVANCE REDRESS MECHANISM (GRM) FOR PAPs AND COMMUNITIES**: Develop and implement a Grievance Redress mechanism for PAPs and Communities (e.g. damage during construction) to address their concerns about compensation, relocation or livelihood restoration and other resettlement infrastructure. GRM for community has already been in place and needs strengthening.	Prior to commencement of resettlement activities or operation or decommissioning.	Contractors/ Owner's Engineer/AGE ESU/MoF.

Measures and Actions to Mitigate the Project's Environmental, Social, Health and Safety Risks and Impacts		Timeframe	Responsibility
36	**BIODIVERSITY RISKS AND IMPACTS:** Aquatic and terrestrial biodiversity in the entire project area is very poor. Biodiversity impacts have been assessed as insignificant. No mitigation measures are required.	No mitigation measures are required.	
37	**RESTORATION PLAN FOR ALL DISTURBED AREAS:** Develop and implement site restoration plan for all disturbed areas. Plan will include revegetation with native species wherever possible and will require monitoring of disturbed areas until vegetation is well-established and self-sustaining. Invasive alien flora species will be monitored and eradicated during construction and operation.	Plan prior disturbance and implement plan as soon as practicable after active disturbance ends or enters extended period of inactivity.	Contractors/ Owner's Engineer/AGE ESU
38	**SITE SPECIFIC ENVIRONMENTAL OR SOCIAL METHOD STATEMENT:** Ensure that Site Specific Environmental and Social Method Statement is developed by the Contractors, approved by the Owner's Engineer and/or AGE ESU and implemented by the Contractors.	Prior to carrying out difficult operation with significant environmental, social or health and safety risks and impacts.	Contractors/ Owner's Engineer/AGE ESU
39	**CULTURAL HERITAGE:** Identify measures to address risks and impacts on cultural heritage and develop plan of removing and transferring in case of accidental find. Include in all Contractor Contract a "Chance Find Procedure"	Prior to disturbance of site.	Contractors/ Owner's Engineer/AGE ESU
40	**Operation ESMS (OESMS) and Decommissioning ESMS (DESMS):** Establish and maintain an environmental and social management system (ESMS).	Prior to start operation or decommissioning.	Contractors/ Owner's Engineer/AGE ESU
41	**SEP IMPLEMENTATION:** Implement the SEP.	Throughout Project operation and decommissioning.	Contractors/ Owner's Engineer/AGE ESU.
42	Training on Occupational Health and Safety including on emergency prevention, preparedness and response arrangements to emergency situations (as described below).	MoMP/CDC/CSO Project Workers	Contractor/ Owner's Engineer /AGE/ESU

a. OHS Safety Training/Orientation

106) Provisions should be made to provide OHS orientation training to all new employees to ensure they are apprised of the basic site rules of work at / on the site and of personal protection and preventing injury to fellow employees. Training should consist of basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, explosions, evacuation, and natural disaster, as appropriate. Any site-specific hazard should be thoroughly reviewed as part of orientation training.

107) The employer should ensure that workers and contractors, prior to commencement of new assignments, have received adequate training and information enabling them to understand work hazards and to protect their health from hazardous ambient factors that may be present.

108) The training should adequately cover:

- Knowledge of materials, equipment, and tools
- Known hazards in the operations and how they are controlled
- Potential risks to health
- Precautions to prevent exposure
- Hygiene requirements
- Wearing and use of protective equipment and clothing
- Appropriate response to operation extremes, incidents and accidents

i. Basic OHS Training

- A basic OHS training program and specialty courses should be provided, as needed, to ensure that workers are oriented to the specific hazards of individual work assignments. Training should generally be provided to management, supervisors, workers, and occasional visitors to areas of risks and hazards.
- Workers with rescue and first-aid duties should receive dedicated training so as not to inadvertently aggravate exposures and health hazards to themselves or their coworkers. Training would include the risks of becoming infected with blood–borne pathogens through contact with bodily fluids and tissue.
- Through appropriate contract specifications and monitoring, the employer should ensure that service providers, as well as contracted and subcontracted labor, are trained adequately before assignments begin.

109) There shall always be a first Aid Kit in at the project site, access to canteen, facilities, areas for rest, drinking water, sanitation (portable toilets) and facilities for washing should be available to laborers. Training at regular intervals to workers should be undertaken by trained staff.

a. Area Signage

110) Hazardous areas (electrical rooms, compressor rooms, etc.), all dangerous work areas and installations, materials, safety measures, and emergency exits, etc. should be clearly marked appropriately.

a. Emergency Preparedness Response Plan

111) The client and its contractors will be required to prepare and implement an Operation Emergency Preparedness Response Plan (EPRP) and train workers what to do in case of an emergency.

a. OHS and EPRP requirements should be mainstreamed in all the Contractual Documents of the relevant Subprojects.

112) The relevant clauses related to occupational health and safety and emergency preparedness response concerns should be part of all bidding and contract documents.

a. Monitoring and Auditing

113) Monitoring and auditing will be undertaken to determine the impact on the environmental, OHS and social aspects because of the construction and operation of the gas pipeline works. General monitoring and auditing will be conducted weekly throughout the construction stage and annually during the operation phase.

114) Routine monitoring and reporting will be undertaken by the Contractor and AGE. MoMP-PIU will develop an auditing schedule and undertake audits in accordance with the schedule.

115) MoMP-PIU staff will be responsible for undertaking environmental and social audits. MoMP-PIU will

maintain all audit records and will be responsible for scheduling follow up inspections to ensure that corrective actions are implemented for any identified non-compliances.

116) MoMP-PIU will be responsible for determining severity of non-compliance and may instruct works to cease until the non-compliance is rectified. A non-compliance register will be established and maintained by MoMP-PIU and all non-compliances recorded there-in.

a. Incidents Reporting Procedure

117) The Contractor will be required to report any environmental or social incidents to the AGE Site Supervisor. The site supervisor will report to the AGE Project Manager and the MoMP-PIU Environmental and Social unit. The MoMP-PIU Environmental and Social Unit will advise the Site Supervisor about appropriate mitigation measures and the Site Supervisor will direct the Contractor to undertake these mitigation measures.

118) The certified OHS Specialist should immediately report any fatality or serious incident to the relevant project director. The project director should immediately share the report with the World Bank within 24 hour. Also, all other incidents need to be reported. The report should clearly show how the incident happened, what was the reason and what actions have been taken to avoid similar future accidents and incidents. The certified OHS Specialist should give Occupational Health and Safety training to all new workers and refresher orientation to all workers.

119) If there are complaints from the community during the construction phase, the MoMP-PIU Environmental and Social Unit is to be notified immediately. The following information should be recorded by the Site Supervisor:

- Time, date and nature of the incident / report;
- Type of communication (e.g. telephone, personal meeting);
- Name, house location and contact telephone number of people making the complaint. If this person
- wishes to remain anonymous then “not identified” is to be recorded;
- Details of response and investigation undertaken because of the incident/complaint;
- Name of person undertaking investigation of the incident / complaint;
- Corrective action taken because of the incident/complaint.

120) The Site Supervisor will prepare and submit weekly monitoring reports to the MoMP-PIU Environmental and Social Unit.

a. Use of OHS Guidelines

121) In order to properly manage OHS concerns all subprojects should prepare and implement an OHS Plan and an EPRP and use IFC/WBG’s EHS General and the Sector specific guidelines and more specifically its section 2 on Occupational Health and Safety

https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines

a. Grievance Redress Mechanism (GRM)

122) There has already been GRC in place for this gas-pipeline project and the Amine Plant. The GRCs structure for Sheberghan-Mazar gas-pipeline project has the following levels:

- **Local or community level GRC:** members include: (i) community representatives/CDCs, AGE local

representative (ii) district representative, (iii) contractor

- **Project site level GRC (gas-pipeline)**: members include: (i) MoMP, (ii) representative of local district governor/provincial governor; (iii) representative of CSO, (iv) Grievance focal officer/PMU;(v) local community/affected people; (vi) representative from ARAZI- MUDL; and (vii) GRM forms are available the complainants at sub-project offices- AGE will also put up complaint boxes on locations that are easily accessible to complainants. Complainants may submit their complaint(s) in a number of ways to the GRC i.e. in a written letter, phone call, SMS message or email.
- **Ministry Level GRC:** (i) Deputy ministry of MoMP (head), (ii) government commission (e.g. RAP implementation commission), (iii) PMU manager, (iv) grievance focal officer, (v) community representative

123) The local GRCs will address each complaint within 7-14 days from receipt of the complaint. If there is no decision within 14 days, the complainant may contact the representative at the Headquarter of AE4D/MoMP, who will then address the complaint within 20 days. An illustration of the activities and timeline regarding the GRM procedure is shown in the figure below.

124) A GRM guidance notes has been developed by the Ministry with inputs from members of the grievances redress committees. The relevant GRM staff will be regularly trained, so that GRM procedures are duly followed in the project. The ESSU's staff within the MoMP and together with local government representatives, must inform community representatives about the GRM and explain the various ways of accessing it during initial meetings. ESSU's staff should explain that a range of mitigation measures to reduce potential negative environmental and social impacts of sub project activities on communities.

a. Budget Estimate

125) Most of the costs associated with the development and implementation of Construction and Operation ESMPs, OHS Plans and EPRP Plans and monitoring, as well as recruitment of qualified and experienced E&S staff and certified OHS Specialist(s) will be included in O&M and Decommissioning contracts.

126) This OESMP will be appended to the O&M tender documents to be published in order to ensure the activities are placed under the responsibility of the O&M Contractor and costed as part of their proposals. The OESMP and Operation OHS Plan and EPRP for the O&M contractor will include a budget to be approved by AGE ESU with a World Bank N/O.

127) In addition, since the implementation of operational measures will be under O&M/AGE ESU's responsibility, part of the operational budget required for the application of measures is provided as a rough estimate. The budget provided below for the operational phase is restricted to the first five years of operation. The following table provides a preliminary OESMP budget estimate, based on main costs.

Table 7: Preliminary OESMP Budget based on main costs

Phase	Item	Cost (USD)
Pre-Operation	Capacity building and training program	$350,000
	Pre-Operation Subtotal	$350,000
Operation (first 5 years of operation)	Preparation and implementation of an Operation ESMP (OESMP), including an Operation Environmental and Social Management System (OESMS) and recruitment of qualified E&S staff	$ 400,000

	Preparation and implementation of Operation OHS and EPRP Plans, including hiring of certified OHS Specialist(s)	$ 400,000
	Monitoring and control of invasive alien flora species	$100,000
	Development of an Emergency Preparedness Response Plan including the purchase of spill kits	$120,000
	Development and implementation of waste management procedures for the operational phase	$20,000
	Development and implementation of a Stakeholder Management Plan for the operational phase	$60,000
	Monitoring of waste production	$30,000
	Monitoring of population expansion along the RoW and engagement with local authorities for a coordination intervention	$100,000
	Monitoring of environmental, social, health and safety performance, including the development of adapted mitigation measures, including erosion control measures	$80,000
	Operation Sub-total	$1,660,000
	Contingency fund (~20% of operation budget)	$332,000
	Preliminary Grand Total	$1,992,000

a. AMINE PLANT

i. Amine Plant Description

Purpose:

128) In addition to the normal hydrocarbon components - methane, ethane, propane etc., Yatimtaq field gases contain, hydrogen sulfide (H2S) and carbon dioxide (CO2) - hence referred to as sour gas. In presence of water, H2S and CO2 present a corrosive environment with potential to cause damage to pipework and equipment on the gas plant, pipeline and IPP power stations if supplied untreated. The sour gases are therefore treated in the amine unit to remove H2S and CO2 before drying and transporting as “sweet” sales gas to IPP power stations and other consumers.

Amine Plant:

129) Designed to International ASME standards, the amine plant was fabricated in Houston, USA in 2012 as six (6) skid mounted units before transportation by air freight and hook-up on the Yatimtaq field in Afghanistan. Table 1 shows amine equipment on each skid and skid dimensions.

Table 1: Amine Skids Constituents and Dimensions

SKID	MAIN EQUIPMENT	EQUIPMENT	LENGTH	WIDTH	HEIGHT	COMMENT
		ITEMS	ft in	ft in	ft in	
1	Contactor, inlet/outlet k/o drums, flash tank	4	35' 1"	13' 0"	12' 0" *	* Contactor - 59' 0"
2	Pumps - amine circulation (2), makeup	3	21' 7"	14' 0"	5' 8"	
3	Amine lean/rich exchanger (2), still/ reflux drum, pumps - amine booster (2), reflux (2), Filters - solids (2), charcoal	10	30' 10"	11' 10"	13' 0" *	* Still/reflux drum - 58' 7"
4	Amine reboiler, fuel gas k/o drum	2	43' 0"	13' 0"	14' 0" *	* Stack 28' 5"
5	Slop tank, slop pump, aircoolers - lean amine, reflux condenser	4	34' 0"	12' 0"	12' 0"	
6	Vent scrubber & stack	1	5' 0"	5' 0"	11' 0" *	* Vent stack - 51' 0"

Amine Process:

130) The amine process is robust and well established based on contacting the sour gases with a chemical solvent - Methyldiethanolamine (MDEA), which has great chemical affinity and preferentially react with H2S and CO2. The sour gases flow upwards and amine solution downwards in a tower (or contactor) with staggered, holed trays for high intensity mixing and reaction of the two phases leading to the removal of H2S/CO2 into the amine liquid phase.

131) The amine with removed H2S/CO2 - termed rich amine, is recovered in the regeneration skid by raising solution temperature to approx. 120°C to release wet H2S/CO2 gases. The regeneration skid has many equipment for heat recovery, cleanup of rich amine in the closed recirculating process.

132) The “lean” amine, free of H2S/CO2, from the still/reboiler (regenerator) is recycled back to start of process and contact with fresh sour gas.

133) The H2S/CO2 removed from rich amine in the regeneration skid is routed to the vent scrubber and stack.

Amine Plant Capacity:

134) The Yatimtaq Amine Plant Unit has been designed to treat 35mmscfd of sour gases containing 0.15% H2S and 2.65% CO2. However, due to limitations in field processing, amine unit deficiencies and lack of troubleshooting operations, the amine unit has since start-up operated well below nominal design capacity, as shown in Table 2 below.

135) The Field Facilities and Amine Optimization Project aims to address the current limitations in processing e.g. unstable flows, hydrates etc. and rectify within amine unit design/engineering shortfall to enable the desired capacities to meet existing consumers and forthcoming IPP power projects (see Table 2 below).

Fig 1: Simplified Amine Unit Process Flow

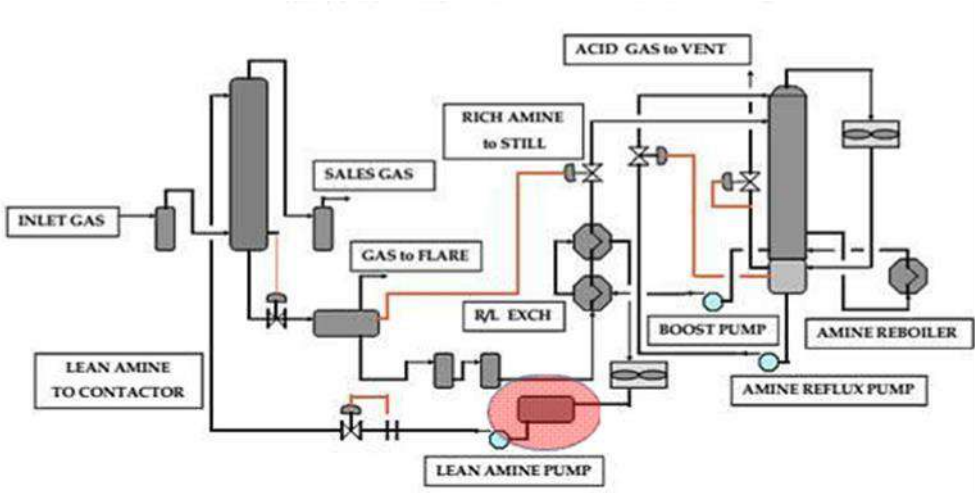


TABLE 2 - Indicative capacities and acid gases removed

CASE	SOUR GAS FLOW	H2S	CO2	H2S REMOVED	EQUIV SULFUR	EQUIV SO2	CO2 REMOVED
	m3/d	% vol	% vol	te/d	te/d	te/d	te/d
DESIGN	963,173	0.15	2.65	2.18	2.04	4.09	45.10
CURRENT	400,000	0.02	6.51	0.11	0.11	0.21	46.01
+IPP PROJECTS	1,120,000	0.32	7.38	5.43	5.09	10.19	146.04

i. Environmental and Social Baseline of the Amine Plant

136) The Amine Plant is located within the Yatimtaq gas field, an industrial area, in the area where the gas pipeline starts. The old gas pipeline and the Amine Plant are operational since 1974. The Amine Plant occupies an area of 1 ha. The surrounding area is a semi-desert area with a sparse vegetation and contains no endemic or IUCN Red List of threatened species. The Amine Plant area has a very low biodiversity. There are no trees in the wider project area. The nearest villages Yaraw Ali, Chaharshanba and Awra Masth are located 8 km away and the Amine Plant is 25 km from Sheberghan. Some of the inhabitants of these villages are workers at the plant. The Community Health and Safety Risks in case of an accident are low. The amine plant is located on govt owned land with no land acquisition and resettlement impact.

137) No ESIA was ever prepared for the plant. The plant has at present no environmental license. The Amine Plant has an Environmental Management System operated by trained staff, including an air pollution control system for H2S (this gas is combusted) and CO2 and a wastewater management system. The wastewater storage pond is not concrete sealed and heavy metals might have leached to the groundwater. There is a laboratory and water quality analysis are being carried out. There is a water purification plant to produce high quality pure water needed for the gas production process. Around 120m2 is polluted with hydrocarbons. There is no environmental reporting system, but they maintain environmental records in hardcopies. An Environmental Inspection has been carried out by NEPA. NEPA monitors compliance of air emissions with national and international standards. Air emissions are in compliance.

138) The Amine Plant has an Occupational Health and Safety System (OHS), as well as an Occupational Health and Safety Manager. PPE, such as helmets, special clothes, boots, gloves, masks, oxygen preparation masks is being used by the employees. There is a gas alert system. There are no leaking gas pipes. One accident occurred, the foot of an employee was burned. The site has no health clinic and no ambulance, which should have been standard.

Photos: Landscape in the Amine Plant area (see photo above)

i. Environment and social Impacts and Management:

139) The amine-based process is robust, well understood and successfully applied over many decades for removal of H2S and/or CO2. in different capacities (to 1000 MMscfd); pressures (80bar+); acid gas removal duties (20% + H2S/CO2 in sour gas); different locations (desert, arctic) etc. Also, it is economic (capex/opex), efficient process, easy to operate and maintain, making amine process first choice for acid gas removal. So ideal for Yatimtaq application.

140) The environmental impact of amine units is well managed and minimized by good design/engineering and established operating/maintenance practices. The Yatimtaq Amine Plant has been designed to international standards as six skid mounted units and incorporate many features to minimize impact as discussed below:

- MDEA: is classified by OSHA as hazardous and chemical suppliers publish Material Safety Data Sheets (MSDS) which contain guidelines for handling and mitigations against eye/skin contact, inhalation, ingestion etc. - these are by no means any more rigorous than common domestic chemicals.

  From environment perspective, the water soluble MDEA is harmful to aquatic organisms and contamination of surface water or into aquifers is avoided in all operation and maintenance procedures.

  Yatimtaq amine skid design provides for trays to trap accidental spills, mechanical leaks (e.g. pump seals), maintenance (filter changeout), amine solution top-up or change-out etc. which are run off to skid edge and collect in slop tank equipped with slop pump to enable managed disposal in accordance to local, regional and national hazardous waste regulations.

- H_2S/CO_2 (acid gases): If released to atmosphere, H_2S at concentrations less than 5ppmv, is an odor nuisance and becomes a safety hazard at concentrations greater than 100ppmv. Strategies for acid gas disposal commonly therefore follow:
  i. Production of sulfur where economics of recovery are favorable (typically 10te/d) or ground level concentration of SO_2 from acid gas combustion at receptors (generally non-worker inhabitants) exceed short time (15min) or 8hr exposure limits. As seen from Table 2, sulfur quantities are below economic recovery and the lack of inhabitants in desert plant environment, both requirements are not met for Yatimtaq amine plant.

And/Or:

  ii. Combustion of acid gases to SO_2 in an incinerator or elevated flare for discharge at high level.

141) Information on Yatimtaq amine plant design show acid gases released within the amine regeneration components - the flash tank (Skid 1) and the amine reflux drum (Skid 3) are collected in the vent scrubber with a vent at 51ft elevation (Skid 6). It is unclear if the vent was hooked up to an elevated flare (or incinerator) during the site construction stage.

142) The amine plant activities have caused no social impacts, as there is no community located close to the site- the plant is built on state land which is free of any squatter and dispute. The nearest villages are Yarawn Ali, Chaharshnba and Awra Masth, which are located about 8 km from the amine plant. There are 35 workers engaged in the amine plant activities, of these, 10 workers from the nearest villages- the three villages mentioned above. Ministry has developed GRM guidance note which will be followed for this site too. AGE/PMU's social staff will conduct information sessions to inform workers about GRM service. The GRC for the gas-pipeline and the amine plant will need to be strengthened to address complaints by workers and communities. Also, the GRC shall include members from workers' representatives.

Action Plan

Input to Environmental Audit Checklist/Questionnaire

143) Below is a checklist presented with the intention to improve environmental management of the Design/Hookup, Operations and Maintenance of the Yatimtaq Amine Plant.

Design/Hookup

Amine

- Check equipment and instrument drains containing amine are collected at each skid edge
- Check amine collected at each skid edge are connected to slop drain
- Check amine slop pump connected to container for disposal of amine waste to meet regulatory or best practice requirements.
- Check storage and handling of fresh amine supplies
- Check eyewash stations and safety showers are installed close to the workstation location.

H2S/CO2

- Check vent scrubber stack is connected to incinerator and stack or to a lit elevated flare and monitor compliance with international air emission standards.

Operation and Maintenance Practices

- Check elevated flare is lit with adequate purge gas
- Check spot levels of H2S, SO2 and BTX
- Check make up of fresh amine solution for top-up of amine circulation
- Check correct personal protection equipment (PPE) is available and used e.g. protective eyeglasses or chemical safety goggles
- Check training of Operator on HSE aspects of Amine, H_2S and CO_2

Maintenance Practices

- As Ops practice, PPE and training of Maintenance team on HSE aspects of Amine, H_2S and CO_2
- Check Maintenance procedures for replacing filter socks, carbon filter
- Check Maintenance procedures for tackling inadvertent spillages
- Check Procedure for handling waste from major overhaul, amine inventory changeout, etc
- As Ops practice, PPE and training of Maintenance team on HSE aspects of Amine, H_2S and CO_2

- Improve wastewater management and monitor wastewater quality, especially heavy metals.

Budget for ESMP

144) Budget to carry out the actions presented above USD 1 million.

Photos: Amine Plant- see Appendix- 5

a. Conclusions & Recommendations

145) The Project is expected to have minor environmental and moderate social impacts and risks, such as: (1) soil erosion and (possibly) contamination, (2) water discharge, (3) impacts on ambient air quality, (4) land acquisition (only a few people will lose some land and some assets), (5) labor management risks, (6) economic development related to the sales of H2S-free natural gas to residential and commercial customers, and important health and safety risks.

146) Implementation of relevant mitigation measures during the operational and decommissioning phases will be able to minimize these negative impacts to acceptable levels. These measures will form part of the contract specifications for O&M and Decommissioning Contractors, Supervising Engineers in order to ensure their implementation and avoidance of negative impacts. Overall, this project would have a beneficial impact whereas its low to moderate negative effects would be monitored carefully and mitigated adequately.

147) Labor influx risk, labor management issues, worker's camp management issues, Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA), prohibition of child and force labor and racial, gender and religious discrimination will need to be monitored and action taken to manage these impacts and risks.

148) In addition, weak capacity of the implementing agency to manage environmental, social, health and safety issues remains a key challenge. The lengthy process for land acquisition and compensation for the project-affected families is a key concern among local communities. Apart from this, this Project has a high profile and has the potential to garner considerable media attention. Some of the sites are in conflict zones which are under insurgents' influence.

Appendix 1: Public Consultation

Consultation meetings with PAPs and other stakeholder for the completed gas pipeline

Name of the project location	**Sheberghan-Mazar gas pipeline**
Name of village:	**Mir Qasim**
Name of the districts	**Chimtal district**
Name of the provinces	**Balkh**
Consultation meetings	**January 2018-February 2019**

Issues Discussed	**Stakeholders (CDCs and community Views and Suggestions)**
General perception about the project and the awareness about the proposed (gas pipeline)	Prior to consultation, people had very limited information about this gas-pipeline project. AGE's social team had given sufficient information about this gas-pipeline (including information about land impact and land clearance survey by Arazi).
Support of local people for the proposed project	All participants promised to support this project. However, they suggested that AGE should provide employment opportunity for local people, including employment opportunities for vulnerable families (e.g. youths).
Identification of Environmental & Social sensitive location	During the transect walk with the community, no environmental/socially sensitive location along the gas pipeline was identified. As the gas pipeline in the completed section passes through barren land (except Mir Qasim village).

Issues Discussed	**PAPs Views and Suggestion**
Land acquisition impacts	All 8 affected families accepted that they are occupying state land but requested for some support- particularly for the affected structures, crops and other assets (fruit and non-fruit tress). It is important to notice that there was separate consultation with each PAP. the stand-alone EPSA provides details about compensation to the affected families.

Local access to pasture interruption-	During consultation with CDC, local representatives raised their concern about their access to the adjacent grazing land. The added that the pipeline activities temporarily restrict local access to the pasture. However, in consultation with local communities, there are sufficient access points provided for local communities and their cattle to smoothly access to the grazing land. It is essential to notice that the completed gas pipeline will be buried under the ground and the depth of the trench is 1.8 m (0.8 meters wide). Once backfilling activities are completed, full access to the pasture will be restored.
Grievance Redress Committee (GRC)	Project level Grievance Redress Committee was established having representation of PAPs, District government, community leader/CDCs, ARAZI and other local stockholders.
Tree removal	There are 9 fruit and non-fruit trees identified that require to be removed.
General socio-economic impact	The main economic activity in the completed section (Mir Qasim village) is agriculture (irrigated and rainfed land and livestock. Farmers are engaged in cultivation of wheat, vegetable are major crops in the area. Some people are engaged in small business and employment opportunities in Chimtal district, but more people migrate for daily wage to other place like Mazar city.

Field Visits

The first site visits to Khoja Gogerdaq and Yatimtaq gas fields was arranged and, specifically, the following sites were visited:

- Amine plant at Yatimtaq gas field (existing amine plant);
- Khoja Gogedaq compressor station;
- the starting point of the new gas pipeline;
- open-air storage for Hydrostatic test equipment;
- open-air storage for pipe lengths;
- pipeline ultrasonic testing spot in 2km from Khoja Gogerdaq Compressor Unit; and
- Bayat Power-1 IPP.

Visit to Bayat Power-1 IPP Construction Site

The Consultant visited Bayat Power-1 IPP, which is located approximately 1km away from Khoja Gogerdaq Compressor Station to familiarise with the construction site and collect initial information about the IPP project during the meeting with Bayat Power engineers. Bayat Power-1 team informed that one power generator driven by Siemens gas turbine SGT-45 is planned to be delivered to site as soon as AGE completes the construction of 700m gas pipeline from Khoja Gogerdaq Glycol Dehydration Unit

(GDU) to the inlet point specified by Bayat Power. AGE representative confirmed that the pipeline is planned to be commissioned in 2019.

Visit to Amine Plant at Yatimtaq Gas Field

During the site visit on 3 February 2019, Amine Plant process train was inspected, and pictures taken. AGE engineers and operators were interviewed on site and valuable information was gathered. The process flow was observed to be in accordance with available documentation as sourced from the vendor ('Zephyr'). The Consultant observed the following:

- gas lines from wells No. 38, 45 and 47 are connected to the three Soviet-time inlet separators;
- only one separator No. 3 (C-3) was in operation and separated gas to feed the Amine Plant;
- Separator No. 2 was under gas pressure 60barg but outlet valve was closed;
- Separator No. 3 was isolated. Inlet and outlet valves were closed; and
- fuel gas for Amine Plant is supplied through the separate small diameter pipeline from Glycol Dehydration Unit (located at Khoja Gogerdaq Compressor Station) to two absorbers A and B (located near Amine Plant).

The preliminary conclusion of the Consultant was the following: Amine Plant design should be revised to change/adjust process lines and instrument control to improve the efficiency of the process and increase the quality of treated gas (significantly reduce H_2S and CO_2 components).

Visit on Compressor and Glycol Dehydration Units Site

On 5 February 2019, the Consultant visited Khoja Gogerdaq field to familiarise with Compressor Unit and Glycol Dehydration Unit (existing units) to validate information which was received during several technical meetings with AGE engineers earlier. In general, the Consultant studied available technical documentation (General Arrangement drawings, Process Flow Diagram [PFD], Process and Instrument Drawing [P&IDs], Start Up procedure, etc.) and during the site visit no significant issues relating to Compressor Unit (CU) and GDU operation were identified.

Site Visit Jarkuduq and Shakarak

On 11 February 2019, the Consultant visited Jarquduq gas facilities and gas wells, as well as the single gas producing well #2 at Shakarak field. The site visit was aimed to review the gas flow scheme of gas gathering at the Jarquduq and Shakarak fields and the gas pre-treatment units at the Jarquduq plant to complete the entire gas supply scheme related to the Consultant's work.

Site Visit to Mazar IPP, AGE Gas Distribution Station (GDS), Balkh River Crossing and Constructed Part of SMPL

On 13-14 February 2019, the Consultant together with Mr Ayoub from AGE inspected constructed part of the new pipeline during the site visit to Mazar IPP, GDS and SMPL.

Appendix 2: Present situation and Actions to be taken for Gas Fields and SMGL

Gas Fields

- four gas fields in the Sheberghan area (Jarkoduq Hauterivian Reservoirs, Yatimtaq, Khoja Gogerdaq Hauterivain Reservoirs, Shakarak) are currently in production;
- Jarkoduq and Khoja Gogerdaq Huaterivians are depleted and not considered as reserves for development;
- urgent task is to update field development plan of Yatimtaq (on production) and Jarkoduq Kugitan reservoirs (approved for production) as well as to procure highly needed equipment and tools for well testing, logging, sampling, metering and measurement;
- two fields justified for production (Koja Gogerdaq Kugitan Jurassic Reservoirs and Khoja Bolan) could be developed within 3 years;
- Juma-Bashikurd field development on hold and may be put in operation in 5 years;
- the development of two fields (Jangl-e-Kalan and Chek-Che) is unclarified. However, they could be considered as long-term projects at 10-year time horizon;
- condition of many wells is unknown due to lack of proper equipment;
- a lot of process equipment is aged and shall be inspected regularly to prevent accidents pro-actively;
- absence of metering devices and tools leads to uncertainty in assessment of current production rates, gas consumption by customers and unproductive losses;
- shortage of automation generates safety and integrity risks; and
- Amine Plant and Glycol Dehydration Unit are critical systems for the current project.

Quality, Health, Safety, Security, and Environment (QHSSE)

Specifically, issues pertaining to security shortage, gaps in QA/QC and lack of PPE, safety equipment, gas detectors, public alarm system, trained firefighters, integrated emergency shutdown of the system, emergency response plan, etc. must be mitigated urgently.

General Issues

- **The absence of Operation and HSE procedures** – Operation and HSE procedures are not available on site, which lead to deviations from the requirements of international standards and HSE practices;
- **The absence of important PFDs** – the drawings are not available for some critical facilities such as Amine Unit which slows down the assessment and analysis of issues; and
- **The absence of SCADA** (phones are used to transfer data or commands; most operations are done manually which causes a significant time delay in response to critical situations) creates safety risks for assets and operation personnel.

AGE Gas Fields

QHSSE observations and findings include:

- HSE management procedure and records are not available;
- working instructions for operation and maintenance of equipment are not available;
- Proper safety and protection equipment are not available. Existing safety and protection equipment are extremely aged and cannot be used due to the non-workable condition;

- personnel do not have safety training certificates (e.g. H_2S survival training, first aid, firefighting, gas detection, work in confined space, heavy lifting, etc.); and
- aged process equipment is in poor condition and creates safety risks.

SMGL part that has already been constructed (44km)

QHSSE

- Personnel security is a high-priority issue to continue the gas-line construction or any inspections between Sheberghan and Mazar-e-Sharif (SMPL). At the moment, even the main road Sheberghan to Mazar-e-Sharif is not secured (armed attacks at police checkpoints located along the highway are taking place);
- HSE management procedures, Emergency response plan, and other HSE related documents are not available and safety training has not been carried out;
- Construction and operation personnel do not have proper PPE (safety boots, hard hats, gloves, safety glasses, coverall, etc.) and use civil clothing or very aged elements of PPE performing operation and construction activities;
- Safety equipment (e.g. fire extinguishers, eye washing stations, H_2S survival kits, portable gas detectors, etc.) is not available on site; and
- Quality control procedures and inspection reports for QA / QC executive documentation which has to be completed according to API5L, The American Society of Mechanical Engineers (ASME) B31.8 recommendations and best engineering practices are not available.

General Information

According to information obtained from AGE, the decision was made to design and install a new pipeline generally parallel to, and approximately twenty (20) meters away from, the existing gas-line since an on-ground survey was not practical due to security concerns. The route of the existing gas-line and the new gas-line are shown in the map of the new gas-line route.

Engineering, Procurement & Construction (EPC) Contractor for the gas-line was not selected because AGE market survey did not identify any licensed EPC contractors in Afghanistan, who would be able to build the gas-line. Foreign EPC contractors did not show signs of interest in the project due to security concerns. That is why construction of the SMPL started in August 2015 by AGE itself using their own personnel, equipment, and machinery. As of 26 January 2019, the following construction works were completed according to information provided by AGE during the kick-off meeting:

- 7 km of ditch was excavated starting from the compressor station at Khoja Gogerdaq. The gas-line was left on the edge of the trench and 7 km of pipes were welded starting from the compressor station at Khoja Gogerdaq. Ultrasound Test (100% UT) was successfully completed for 2 km of that 7 km gas-line section. The gas-line welds have not been coated and the gas-line has not been lowered-in yet. Daily progress reports, weekly reports, results of UT and Hydrostatic testing are in Dari language. These were archived in AGE office and provided to the Consultant for review (hard copies only). The welded sections of the gas-line are left exposed along the trench.

- Approx. 2.3 km of the SMPL were welded, coated, lowered-in padded and backfilled starting from the fence line at the NFPP Metering Station (exact GPS coordinates to be determined during site visit) to Balkh River (exact GPS coordinates to be determined during site visit). UT and preliminary hydrostatic pressure test, visual inspection of welds coating and pipes were successfully completed in accordance with TFSBO recommendations based on API and ANSI requirements. Daily progress

reports, weekly reports, results of UT and preliminary Hydrostatic testing in Dari language were archived in AGE office and provided to the Consultant for review (hard copies only).

- Approx. 200m river crossing was not performed because the design of the catenary bridge river crossing has not been developed yet (TFSBO recommended a two-cable aerial catenary bridge to avoid cutting the banks of the river). However, 200m section of the pipe (OD 12.75" (NPS 12), w.t. 0.5") has been welded and stored near the future river crossing point (according to ASME B31.8).

- Approx. 17 km of the SMPL was welded, coated (welds), lowered-in, padded and backfilled starting from Balkh River (exact GPS coordinates will be determined during site visit) towards Sheberghan (exact GPS coordinates will be determined during site visit). The backfilled part of the gas-line crosses a residential area/village, which is located near the Balkh River. UT and preliminary hydrostatic pressure test, visual inspection of welds and pipes coating were successfully completed in accordance with TFSBO recommendations based on API and ANSI requirements, but it is necessary to execute a holiday test on the coating.

- Daily progress reports, weekly reports, results of UT and hydrostatic testing are in Dari language were archived in AGE office and provided to the Consultant for review (hard copy).

- After a total of 19 km of the backfilled gas-line, additional 18 km of the trench was excavated and 18 km of the gas-line sections along the trench were welded starting from AGE GDS towards Sheberghan. That 18 km of the gas-line welds have not been coated and the gas-line has not been lowered-in yet. Daily progress reports, weekly reports, results of UT and preliminary Hydrostatic testing in Dari language are archived in AGE office and provided to the Consultant for review (hard copy). The welded sections of the gas-line are left exposed along the trench.

- One block valve and two gas vent valves were installed (exact GPS coordinates will be determined during site visit) near Balkh river (from Mazar-e-Sharif side). Three (3) more valves are planned to be installed.

- The total length of the welded gas-line is 44 km. Remaining 45.1 km of the gas-line route should be constructed: ROW, trench excavation, welding, UT control, coating, lowering-in, padding, backfilling, cleaning and gauging, testing works have to be completed.

- Corrosion and Cathodic Protection, SCADA System, Leak Detection and Control System for the gas-line have not been designed yet. The survey has not yet been done.

Gas-line construction works (row and trenching) were done by two AGE teams: (i) one team worked from Sheberghan side; and (ii) another team worked from Mazar-e-Sharif side. AGE has approx. 50 km of pipes and gas-line block valves at the storage near Sheberghan and about 6.4 km of pipes at the storage near Mazar-e-Sharif. However, consumables, ancillary, instrument, and metering equipment have yet to be procured.

Document Control System

Site and Construction Safety procedures according to the best engineering practices are missing:
This concern: General guidelines to ensure minimum safety issues such as: ensure that all members of the activity crew understand their role and responsibility with respect to safety in execution of the work plan,

schedule and administer tailgate meetings prior to commencing safety-sensitive work (e.g., tie-in, excavation requiring shoring, line evacuation, hot cuts, etc.);

Design

- Geological, geodetic, environmental and hydrological engineering survey have not been done. Last surveys for existing gas-line route were done by Soviet engineering company ('Vostokgiprogas') in 1965. These results could be used for general information only and a new survey is required to design the new gas-line to continue construction;
- The proposed AGE catenary bridge river crossing method has not been assessed based on survey results, which is an integral part of the design and have direct influence to the cost, safety and time of the construction;
- The design for Cathodic protection system has not been developed yet. In addition, it directly impacts environmental, social, health and safety policy; and
- The decision on SCADA and Leak detection system should have been designed but is still pending.

Construction

- Construction has started without any developed and approved design documentation and construction procedures. It was decided to follow the existing gas-line route just 20 meters south from the existing gas-line. The location of block valves was planned to be the same as for existing valves. The depth of the trench is about 1.8 meters in line with recommendations of the US Army Corps of Engineers.

- However, the width of the trench is 0.8 meters instead of 1.0 meter recommended by US Army Corps of Engineers. The inspected part of the trench is in good condition. However, it will be required to clean the trench before the pipe lowering-in due to a lot of sand caused by sandstorms. At least 0.2 meters of sand padding should be arranged for all gas-line portions deemed to require padding. It is planned not to mark the new gas-line route due to security reasons, which also applies to the existing gas-line. Existing valves are hidden in concrete manholes due to security reasons as well.

- It will be difficult to achieve goals and quality for the gas-line construction without necessary procedures, approved for construction (AFC), quality forms (inspection reports), including procedures for acceptance of pipe lengths and materials (valves, fittings, etc.).

- HSE management procedure or manual for construction has not been developed. HSE meetings, briefings, workshops, reporting, safety log book, inspections, training have not been arranged.
- Design capacity shall be achieved by SMPL commissioning date.

Following main findings:

- total length of SMPL route from Khoja Gogerdaq Compressor Station to Gas Distribution Station near Northern Fertiliser and Power Plant (NFPP) is 89.1km, which is the same as the length of existing gas-line operated by Afghan Gas Enterprise (AGE);
- despite absence of proper design documentation, based on engineering survey results and independent Quality Assurance / Quality Control (QA/QC) supervision, the construction works started in August 2015 and continued for about three years. The main approach was to install the new gas-line 20 meters from the existing one and overall keep a 1.8-meter deep trench;
- Welding quality was ensured by third party using calibrated Ultrasound Testing Kit, which was sufficient for construction stage. Also, hydrostatic test was accomplished for backfilled sections of SMPL to check welding joints in addition to ultrasound test;

- construction progress was recorded in Site logbook and Daily reports only. All other procedures and documents, which are required for gas-line construction in accordance with international standards as well as best engineering practices are missing;
- On 26th of January 2019, when the Consultant arrived at Sheberghan, AGE had welded about 44km of the SMPL, mainly from the Mazar-e-Sharif side. However, only 19km of the SMPL were backfilled, and 25km of the gas-line were just welded and left unprotected on the surface near the open trench;
- backfilled gas-line sections are crossed by field roads or gullies and do not have any protection against damage. This is in contradiction to the existing gas-line which is covered by concrete slabs;
- temporary Cathodic Protection for the construction period has not been implemented, as it was recommended by the US Army Corps of Engineers to cover the entire gas-line route using sacrificial anodes according to international standards; and
- Gas-line installation works were stopped due to several important reasons listed in Potential Challenges below.

Challenges and Way Forward:

The Consultant has identified the following key challenges that require attention:

Gas Fields

- Lack of credible data to update the estimation of gas reserves completed by Soviet specialists. Modern scientific methods and practices should be used to collect and analyse information required for estimation;
- New field development plans are absent and should be developed as soon as possible;
- Reserve classification is not officially agreed. Petroleum Resources Management System (PRMS) should be used to classify gas reserves;
- All production wells shall be tested, and potential gas production should be measured;
- Metering system is required to control gas production and consumption;
- Automation and SCADA are highly desirable to improve operability and increase integrity;
- AGE production profile and drilling schedule shall be developed to ensure sustainable gas supply into the distribution system;
- Aged pressure vessels should be properly tested and re-certified before any changes in the process scheme;
- Connection of Bayat Power-1 Plant to AGE gas distribution network shall be carefully assessed and changes in gas treatment process must be designed and managed properly. In that case, AGE will manage three different pressure systems (Bayat IPP, Mazar IPP and NFPP/domestic customers);
- Condition of existing gas-line is unknown and detailed inspection is required to assess the remaining operation time. Any plans to use it as a temporary alternative to SMPL to supply increased volume of gas with higher pressure to Mazar IPP should be based on the inspection result analysis.

SMGL Gas-pipeline

- Security shall be guaranteed along entire SMPL route to protect AGE's and contractors' personnel;
- Modern and new PPE shall be provided to AGE labour force to meet standard international HSE requirements and protect people, environment and assets;
- Project documentation shall be developed from scratch;
- Proper project budget should be secured to avoid unplanned interruptions in construction process;

- Deteriorated equipment shall be replaced urgently to accelerate construction works with required safety and quality;
- Proper engineering survey works and detailed design in accordance with international standards and best engineering practices shall be completed to ensure planned progress of construction in accordance with approved project schedule;
- Missing devices, materials and consumables should be procured in advance to continue construction smoothly.

In general, AGE engineers have necessary skills to construct the gas-line if necessary equipment, devices, materials, and etc. are procured, proper standards and procedures are followed, and all necessary design and project documents are prepared. Unicon proceeds with the inspection/audit of partially welded and backfilled gas-line sections, assists AGE in construction preparation works, continues Environmental and Social Impact Assessment (ESIA) baseline surveys, and assesses the actual deliverability of existing wells and gas treatment/sweetening installations.

Construction could be resumed after design engineering documentation has been developed and ready at AFC (Approved for Construction) gate.

Capacity Building

Potential gaps in capacity of AGE personnel were identified and analyzed by the Consultant.
Definitely, AGE personnel should be trained and certified to perform construction and testing activities safely and properly during development of the project. The Consultant developed a dedicated Project Capacity Building Program, which is based on the results of analysis and best engineering practices. The Capacity Building Program should also build capacity in Environmental and Social Management, as well in Health and Safety Management along the lines as described in Appendix 2. A specialized dedicated Environmental, Social, Health and Safety Unit needs to be established urgently within AGE and be manned with highly qualified and experienced staff who will be responsible to manage the Environmental and Social Management System (ESMS) still to be established.

Appendix 5: Photos- Amine Plant

Amine plant (Gas inter to the system)

Amine Plant macheniry

Amine Plant macheniry

Amine Plant (Sulfur seperation)

Amine Plant (Sulfur seperation)

Amine Plant (Gas purification system)

Air pollution prevention system

Water purification system for gas production

Air pollution prevention system (H_2S combustion)