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SHEBERGHAN GAS GENERATION ACTIVITY (SGGA)
Contract No. EPP-I-00-03-00004-00, USAID Task Order No. AID-306-TO-12-00002

# Environmental Compliance Report
# For Contract Agreement MOMP/1344/ICB and NEPA Environmental Management Plan Juma-Bashikurd Gas Field, Jawzjan Province

March 23, 2016

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# Table of Contents

## Acronyms and Abbreviations

| | |
|---|---|
| AEAI | Advanced Engineering Associates International |
| AGE | Afghan Gas Enterprise |
| AGS | Afghan Geological Survey |
| APA | Afghanistan Petroleum Authority |
| GOA | Government of the Islamic Republic of Afghanistan |
| MoMP | Ministry of Mines and Petroleum |
| OGS | Oil and Gas Survey |
| OSHA | United States Occupational Health and Safety Administration |
| PPP | Public-Private Partnership |
| RFP | Request for Proposal |
| SGDP | Sheberghan Gas Development Project |
| SGGA | Sheberghan Gas Generation Activity |
| TPAO | Turkish National Petroleum Corporation |
| USAID | United States Agency for International Development |

## Executive Summary

Turkish National Petroleum (TPAO) has completed phase I of the Sheberghan Gas Development Project (SGDP), which comprised of 26 km gravel road construction, central camp establishment, and drilling operations at three gas well sites located in Bashikurd, Jawzjan Province. Following completion of the civil works and drilling operations, TPAO completed its demobilization activities on February 29th, 2016. AEAI issued a contract to Credible Construction Company (CCC), as a third party, for inspection of TPAO's completed works. The inspected works were evaluated for compliance against project EMP, EIA regulation of Afghanistan, and reliance of the contractor upon International & best practices.

Due to security concerns and the inability of local authorities to provide security, the locations for Bashikurd Wells Nos. 3 and 9 were not accessible for on-site inspection. CCC has relied on the information and photographs in the TPAO Field Abandonment Report (March 2016) to determine the conditions at these locations.

On March 2016, CCC initiated its inspection of the site in relation to air quality management, waste management, drainage and sanitary water management, vegetation reclamation, and well abandonment procedures. The inspection identified that the contractor has not complied fully with the EMP, as solid wastes and sanitary waste water have not been managed in accordance with standard practices identified in EMP. The site is left with ditches and berms that hinders natural drainage and inhibits re-establishment of natural vegetation. Additionally, temporary facilities like septic tanks are not treated in accordance with the standard practices identified in EMP. These abandoned tanks are a source of disease dispersal, incidents (animal falling and entrapment), and the stagnant waters provide sanctuary for pests, pathogens, and flies.

The condition of the access road was also assessed. The slopes of the road are disturbed and rutting was prevalent along the road. These problems are more evident from main road to OMC due to heavy traffic during project implementation period. According to project contract and EMP, the contractor is responsible to leave the road in good and usable condition. At the end of all works, the damaged areas of the road should have been repaired by the contractor.

In this report, CCC also provides a cost estimate for all the remaining works, including leveling of berms, waste management, and road repairs. The estimates are based on prevailing market prices for these types of work in Jawzjan Province.

## Introduction

Following the completion of demobilization activities by the contractor, CCC inspected the site to assess the quality of completed works and compliance with environmental concerns. A detailed description of the quality of performed works is provided in this report. Pictures provided in Annex-1 of this report facilitate a visual description of the site.

## Purpose of Compliance Inspection Report

The purpose of this Compliance Inspection Report (CIR) is to inspect the environmental compliance of civil works performed by TPAO at the Juma/Bashikurd gas field against the EIA regulation of Afghanistan dated March 10th, 2008 (official gazette No. 393), and 22 CFR 216[1] in accordance with the Environmental Management Plan that was originally approved by the Ministry of Mines, and Petroleum. This CIR covers activities undertaken by Turkish National Petroleum during the period of December 1st, 2014 to March 1st, 2016 with specific focus on demobilization activities performed by TPAO after completion of drilling activities. Specifically, this compliance assessment exercise assesses the conditions of access routes, contractor's camp location, three drill sites, and sanitary waste disposal requirements of the project after closeout activities.

## Compliance Inspection Reporting Requirement

This report has been developed in relation with the compliance reporting requirements as defined in the Environmental Management Plan of this project.

## Current Status of the Project Site

The final phase of the project, site cleaning and demobilization is completed. Demobilization activities included the demobilization of equipment and temporary structures, site cleaning, filling and excavation activities, disinfection of environmentally sensitive structures, and compaction activities. TPAO completed its demobilization activities on March 1, 2016. TPAO has i) demobilized all the facilities/structures from the site, ii) attempted to cover soak pits at all the three drilling sites, iii) partially covered some of the septic tanks, removed some of the onsite sewer from drill and camp sites. However, the quality of works performed does not fully comply with best practices and the agreed EMP.

## Project Activities Covered by CIR

The compliance inspection and assessment of contractor's civil works is performed from 1 to 6 March, 2016. This CIR highlights the quality of the:

- 26 kilometer gravel road,
- Three gas well drilling sites, namely Bashikurd-3, Bashikurd-9, and Juma-2A (also located in Bashikurd area) after demobilization, and
- Central camp site

[1] Title 22, Code of Federal Regulations, Part 216. It is USAID's procedure to undertake environmental impact assessment of projects/programs. All USAID funded activities should take in consideration this code while implementing projects/activities.

## Background

The Juma- Bashikurd gas field is located at a distance of 20 Kilometer south west of Sheberghan city. Phase I of the Sheberghan Gas Development Project was awarded to Turkish National Petroleum (TPAO), and the work comprised of i) construction of 26 Km gravel access road with an approximately 10 years life span, ii) central camp construction, and iii) the drilling of three gas wells. The specific activities of this Phase involved initial drilling, construction, and operation of gas wells located at Juma-2 and Juma 2A, and reentry of gas wells at Bashikurd-3 and Bashikur-9. Additionally, TPAO had prepared a well location for re-entry of the Bashikurd No. 9 well, but the re-entry operation was cancelled. Furthermore, a camp area is also constructed under this project contract. Other incidental activities on this contract included construction of concrete pads for drill areas, HESCO barriers for perimeter protection, tracks, mud pits, compaction of areas around the drill sites, and, placement of septic tanks,.

The financial assistance for completion of Phase-I is provided by United States Agency for International Development (USAID) with implementation support by AEAI. The Ministry of Mines and Petroleum (MoMP) is the project implementation agency.

## Bio-physical Characteristics of the Site

The area around the project site is semi-desert. Ground cover is sparse, consisting of drought resistant grasses including needle grass, sheep fescue, blue grass, and sedge. Grass usually dies by mid-summer and returns with the rains of spring time.

The main soil type at the project site is loess loam. Loess soils generally have excellent permeability and can absorb large quantities of water. However, inadequate drainage measures may cause flooding through surface run-off during heavy rain season (March and April - where rainfall is highest averaging at around 56.4 mm per month).

The access road area is also semi-desert with no human habitation similar grass types as the whole region. At a distance of approximately one Kilometer from access road, temporary mud belonging to nomads are observed, which are used during spring for animal grazing and are abandoned during summer.

The site is a habitat for various vertebrate species including species of ground squirrel (*Spermophilopsis leptodactylus*), falcons (*Falco spp.*), jerboas (*Allactaga spp.*), caracal cats (*Caracal caracal*), and striped hyenas. There are no known rare or endangered animal species within the project area.

## Environmental Compliance of the Project
## Site Demobilization & Compliance with EMP

Completed works and demobilization activities executed by the TPAO is assessed against the Environmental Management Plan, which was developed during planning phase of the project by Advance Engineering Associates International (AEAI), and was submitted to the National Environmental Protection Agency (NEPA) for the purpose of receiving the environmental compliance certificate. CCC has assessed the condition of the access routes, issues related to site cleaning, filling of ditches, leveling of berms, proper disposal of waste from the site, filling of soak pits, compaction of loose materials, and septic tank treatment measures before leaving the site.

## Air Quality

The well sites were free of odor of H2S, MH4 and other gases. As all drilling operations are completed, therefore emissions are not observed. Hence the air quality at all the drill sites is deemed “good”.

On the other hand, the air quality at the OMC camp site is assessed as "not good". The solid waste disposed in front of the OMC site has deteriorated the local air quality (see picture No. 13 & 14). In this regard, the contractor has not complied with EMP requirements (please refer to point 7.1.1 of EMP). An unpleasant odor could be felt at the site due to untreated waste. The untreated waste at site poses a critical threat of disease, and contributes to the disturbance of local flora and fauna. Therefore, contractor is urgently required to remove the waste from site to a proper waste disposal facility/location.

## General/Household Waste Management

The drilling operations and demobilization activities at the project site (all the three drill sites, camp site, and access routes) had been complete by the contractor before the initiation of CCC's inspection activities. In accordance with EMP (please refer to point 7.1 of EMP), the Contractor is responsible to store, transport and dispose all household waste in such a manner as not to cause damage to life, health, property, underground or surface sources of fresh, potable water or water useful for other purposes, or endanger the wellbeing of the employees of the contractor, maintenance crew, or members of the public.
During this inspection it was identified that the contractor has not managed the solid wastes properly. In general, waste dispersal is found at following locations of the camp site:

- In front of the OMC (see picture No. 13).
- At the north of the OMC (see picture No. 28).
- Around camp site (see pictures No. 14, 15, and 16).

The decomposition of household waste has caused very bad odor, which is sensed clearly at the locality of the camp site. These wastes can be sources of disease, and they provide sanctuary to rodents, flies, and mosquitoes. Since the region is in the grazing season for the nomads' livestock, these wastes are considered as immediate threat that must be neutralized immediately.

## Waste Water Management

Mainly, throughout the project implementation, two types of waste water are generated - sanitary waste, and produced waste water during drilling operations. The compliance of contractor in relation with managing this waste water is assessed during this inspection exercise, particularly against the EMP.

## Sanitary Waste Water Management

During project implementation, waste waters generated from washing and sanitation is directed to septic tanks at camp site. Only one septic tank located in front of the camp site had been connected to washroom, which remains half filled with sludge and grayish black colored water. The condition of the septic tank can be seen in the picture provided in this report (Annex 1, pictures No. 17 & 18). The mentioned septic tank is not emptied, disinfected, refilled with dirt, and marked with proper signage.

As a requirement of project closeout, the contactor should have emptied the mentioned septic tank, dispose the sewerage water to an appropriate waste water disposal facility/location, disinfect the septic tank, fill it with locally available soil, compact it, and demark it with a proper sign.

## Produced Waste Water

Produced waste water and drill fluids were directed to excavated in-ground pits by the contractor during drilling operations. During this inspection, it is assessed that these pits located at all the three drill sites are filled with locally available soil, graded, and compacted by the contractor (seed picture No. 5, & 6). Since the soak pits are filled, it could not be determined if they were disinfected by contractor prior to filling. The

contractor is required to submit detailed proofs of proper measures taken while filling, grading, and compacting the soak pits.

## Sanitary Waste System

Each drill site had been provided with three septic tanks. In accordance with line item 1.4.11 of the EMP, and environmental considerations of the project, all onsite septic tanks should have been emptied, disinfected, filled with soil, and marked with proper signage. In contrast, the contractor has not taken appropriate measures in relation with these septic tanks located in all the three drill sites. Two of the septic tanks located at eastern, and north eastern part of the Juma2 drill site are partially covered/buried under the soil at approximately three meters (see picture No. 7). The locations of these septic tanks are not easily identifiable on site as there are no appropriately erected signs indicating their presence and locations. As the mentioned septic tanks are buried under soil, it may be damaged and inappropriate for future use. Additionally, septic tanks located at the entrance of Juma 2A are not disinfected, filled, and marked with proper signage. Since the security concerns were high and the inspection team could not inspect the Bashikurd 3, and 9 drill sites, it is assumed that the condition of the septic tanks particularly in Bashikurd 3 would be similar to Juma 2A.

Furthermore, at the camp site, the concrete slab/lid of one septic tank is found broken. Potentially dangerous exposed rebar of septic tank are visible in picture provided below (see picture No.21 & 22). Therefore, appropriate measures in filling, covering, and marking septic tanks areas is crucial.

Referring to the EMP line item 11.4.4, the contractor should not establish a dry or composting sanitary system, latrines, or pits. The contractor had established a pit latrine at back side (south) of the camp. The contractor is responsible to take necessary measures in demolishing, cleaning, and treating the latrine pit before leaving the site. During this inspection exercise, it is assessed that appropriate measures are not taken by the contractor in this regard. Hence, the latrine pit is a threat to soil that can cause contamination, diseases dispersal due to gathering of flies, insects, and other infectious micro-organisms (see picture No. 31, 32 & 33).

## Disturbance to Vegetation Cover

During project implementation, operational activities were limited around camp and drill sites. Vegetation disturbances are kept within the vicinity of work and have not spread to further distances. However, the contractor should have properly graded and leveled the areas around camp and drill sites in order to allow natural drainage. Leveling the site will encourage regrowth/re-establishment of natural vegetation, which is a requirement of the EMP.

## Project Site Leveling, and Cleaning

This section is related to the discussion point mentioned above as it further highlights the issue of proper drainage and facilitation of local vegetation re-establishment. During project implementation period, berms and ditches are established for various purposes, e.g. flood control, securing the site perimeters by establishment of boundary wall around campsite and drill sites. During this inspection, it is assessed that the contractor has removed all the temporary facilities e.g. HESCOs, boundary walls, guard rooms, connexes/containers, and equipment. However, the berms and boundary wall stock piles are not properly leveled. Additionally, leftover materials from demolished facilities at camp site are not disposed of offsite (see picture No. 29 & 30). Moreover, as alluded above, the ditches around the camp site and drill sites are not filled and leveled to support natural drainage (see picture No. 1 to 4 & 23 to 27). The project EMP

requires maintenance of natural drainage, and thus the contractor is required to level the areas around camp and drill sites accordingly.
Following the non-compliance of the contractor in relation with above mentioned points (berm leveling, ditch filling, stock pile leveling, and solid waste disposal) the contractor is required to complete the works or compensate the cost. The estimated cost in relation with filling, and leveling is provided as lump sum in Annex-2.

## Access Routes

The total length of gravel road constructed by TPAO is approximately 26 kilometers. The condition of the constructed road is assessed in relation with durability and compliance against EMP.

According to the EMP, the road is required to be left in good and usable condition, and the contractor should place gravel, grade, and repair the roads after removal of all equipment and facilities (refer to point MP 1.4.9 of EMP). Our previous inspection indicated that the road parameters was well built and could accommodate the anticipated "usual" vehicle traffic flow. Additionally, the width of road was also assessed as adequate for movement of drilling equipment and other vehicles. However since this is a gravel road, it is more susceptible to wear and tear especially during repetitive movements of heavy equipment. During drilling activities, the road was exposed to heavy equipment traffic more than usual, and thus requiring more maintenance and repair work afterwards.

After the completion of the drilling and construction activities, the road slope and upper surface is disturbed and needs rehabilitation. The crown of the road shows damage and rutting is also visible along the road. Since A-1 material is used on the road (granular material), it needs rough grading and maintenance of its crown and transverse slope, which allows proper surface drainage and avoids ponding on the road surface. Since the contractor is obligated to leave the road in good and useable condition, at the end of all works, the road should have been returned to its optimal condition. The additional cost on rehabilitation of road is estimated in table provided in Annex-2.

### Drainage and Stream Flow along Access Route

The contractor is required to submit a report on site cleaning including cleaning of culverts before leaving the site. Culverts along the road are assessed to be in good condition. In total, along the access road, nine culverts are constructed or rehabilitated. Information on culvert type, location and structure, are provided in table below:

| S.No. | Culvert description | Structure | Location |
|---|---|---|---|
| 1 | Main road to OMC First culvert | RCC | Near Main Asphalt Road |
| 2 | Main road to OMC second culvert (Rehabilitated) | Two Steel pipe culverts | Midway b/w OMC, and Asphalt road |
| 3 | OMC to B-9 First culvert | Wing wall, concrete culvert | OMC to B-9 |
| 4 | OMC to B-9 Second culvert | Parapet, two pipe culvert | OMC to B-9 |
| 5 | OMC to B-9 Third culvert | Parapet, two pipe masonry culvert | OMC to B-9 |
| 6 | OMC to Water supply well | Two pipe masonry culvert | Midway b/w OMC &water well |
| 7 | OMC to B-3 First culvert | Two pipe masonry culvert | OMC to B-3 |
| 8 | OMC to B-3 second culvert | Two pipe masonry culvert | OMC to B-3 |
| 9 | OMC to B-3 third culvert | Two pipe masonry culvert | OMC to B-3 |

## Well Abandonment

In accordance with line item 1.4.7 of EMP, the contractor is responsible to submit a written well abandonment plan before commencing abandonment operations. Following the submission of the mentioned plan, the contractor has completed the well abandonment operations. The contractor has also submitted the report on the well abandonment, which clearly depicts the techniques/methodology used by TPAO on well abandonment. The report states that during well abandonment, three cement plugs casings have been established at below mentioned depths:

- Cement plug 1: pumped between 3310 - 3433 m
- Cement Plug 2: pumped between 2900 - 3301 m
- Cement Plug3: pumped between 100 - 200 m

Following the project EMP and "best practices" requirements, the contractor should cut the casing of permanently abandoned wells at least two meters below the estimated restored surface level and place cement to a depth of at least three meters below the top of the cut casing. The top of the casing should be permanently sealed by a steel plate and marked appropriately warning clearly that the removal of the welded plate may result in injury or death (please refer to point 1.4.5 of EMP). Additionally, temporarily abandoned wells should have a metal sign affixed to the wellhead noticeably indicating the name of the operating agency and the name and the number of the well.

During this inspection, it was identified that the contractor has sealed the drill well with metal plate and embroidered the plate with the name and number of the well (see picture No.12). However, the contractor has not affixed cautionary warning signs, which is quite important in alerting local people of the presence of these wells.

## Miscellaneous Environmental Concerns

Since gas drilling and generation projects cover a broad spectrum of activities and require a wide range of environmental considerations, during this inspection the following additional inspections were also performed.

## Hazardous Material

No indications of hazardous materials were found during this inspection.

## NORM Management

During the environmental inspection it is realized that there is currently no NORM disposed at the site. Therefore, the site is declared as free of naturally occurring radioactive materials.

## Cultural Heritage

In accordance with EIA regulation of the Environmental Law of Afghanistan, project implementation at archeological sites is prohibited. The contractor is responsible to notify contractor, MoMP, NEPA, and other relevant authorities within forty eight hours of the discovery of the cultural, historical, or natural heritage sites, precious mineral deposits, and paleontological remains. This inspection identified that throughout the project implementation period, none of the above mentioned culturally significant issues were reported.

## Mines and Unexploded ordnance (UXO)

In accordance with EMP and law enforcement regulations of the country, the contractor is obliged to immediately notify the MoMP and the provincial military and police if mines or unexploded ordnances (UXO) are located at the project site. During project implementation period, no reports on mines, and unexploded ordnance were filed. However, during this inspection, the provincial security forces informed that after withdrawal of contractor's security team there is possibility of newly placed mines on and around the site. Therefore, prior to moving on site, precautions should be observed.

## Findings

CCC's summary of findings is:

- All temporary structures and facilities are removed from the drill and camp sites.
- The road slope and upper surface are disturbed, which requires rework. The crown of the road show some damaged and rutting is visible along the road due to HTV movement.
- Permanent and temporary abandoned wells have issues.
- Septic tanks at camp site and drill sites are left without taking appropriate measures e.g. disinfecting, filling it with soil, compacting, and marking with signage.
- Berms around the camp site and drill sites are not properly leveled.
- Ditches around camp site and drill sites are not filled with top soil.
- Some vegetation disturbance is observed around drill and camp sites. The contractor should properly level and grade the area to facilitate re-establishment of natural vegetation.
- Solid wastes are disposed of in front of the OMC, which, after decomposition, has affected the local environment by emanating foul smell, fly accumulation, and soil contamination.
- Solid waste is found dispersed around camp site.
- Pit latrine has not been completely demolished at camp site. The human waste scattered around the latrine location, and fly gathering is observed.

### Recommendations

CCC presents the following recommendations:

- The contractor is contractually required to rehabilitate the road before leaving the site. Therefore, the contractor must rehabilitate the road by scarifying, placing additional appropriate materials, and rough grading the road. The estimated cost for these repairs is provided in table shown in Annex 2.
- Gas well should be demarcated by appropriate signs
- The maintenance of road is required to keep its transverse slope and crown in good condition, which will allow proper drainage.
- Existing berms all around OMC and at Southern and Western part of Juma-2A should be graded and leveled.
- Ditches around OMC, and drill sites should be filled, leveled, and graded. The ditches should be leveled to allow natural drainage, and facilitate natural re-establishment of local vegetation.
- Abandoned septic tanks around OMC and Juma-2A should be disinfected, marked and covered with soil for possible future usage.
- Latrine Pit located at the back (south) of the camp site should be cleared from feces, covered with soil, and compacted.
- Garbage and wastes, both dispersed and disposed in front of the camp site, should be removed to an appropriate location.

- Annex 4 sets out the full text of the Environmental Management Plan (EMP), and is provided for quick reference to the exact requirements. The inspection checklist provided in Annex 3 is based on the specific EMP requirements.

## Annex 1 – Juma-Bashikurd Operations Site Pictures

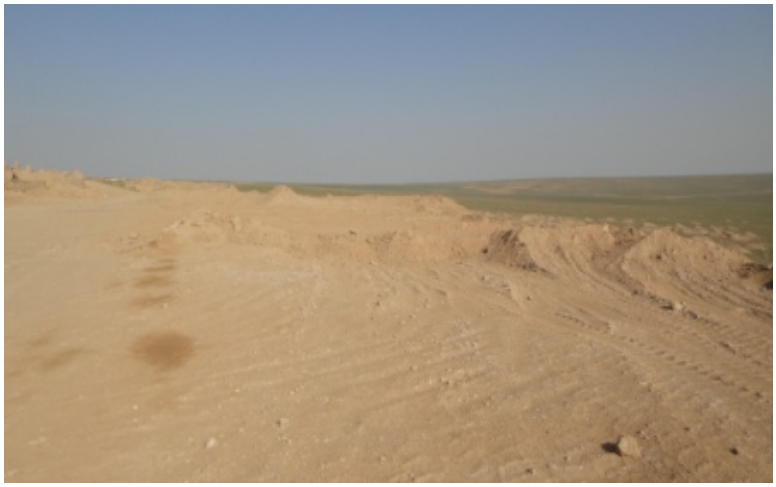
East view of Juma-2 drill site (Picture No. 1)

East view of Juma-2 drill site showing berms (Picture No. 2)

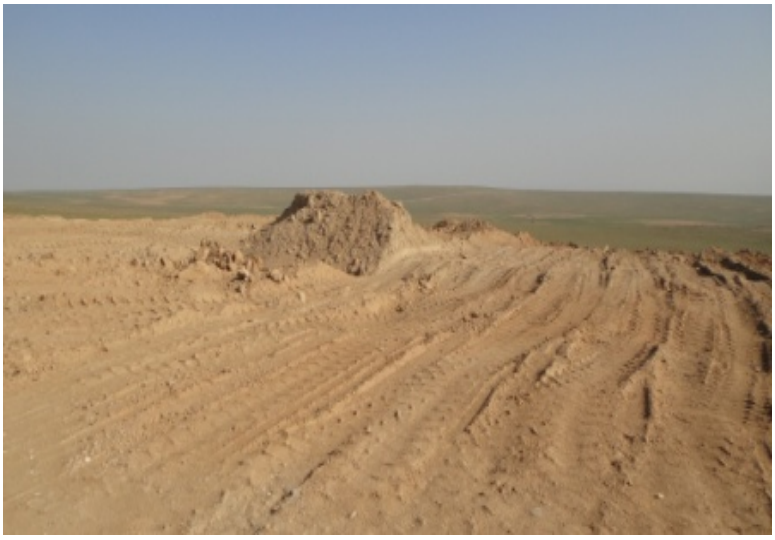
North view of Juma-2 drill site (Picture No. 3)

South view of Juma-2 drill site (Picture No. 4)

Pits filled with local material, graded, and compacted



West View of the Juma 2A drill site (Picture No. 5 & 6)



Septic tank at Juma 2A drill site covered with soil only (Picture No. 7)

Septic tanks incompletely buried under soil (Picture No. 8)

Berms not leveled around Juma2a well site. Compacted area not Broken up. (Picture No.9)

Excavated ditch at western part of Juma 2 (Picture No. 10)

Ditch & HESCO left at Juma 2A site (Picture No.11)

Juma2A Cellar Site marked with well number. Not marked with sign (Picture No. 12)

Waste disposal adjacent to OMC campsite (Picture No.13)

Waste disposal at OMC camp with stock piles of demolished structures (Picture No.14)

Waste at OMC site (Picture No. 15)

Stock piles from demolished structures at OMC site: containing plastic sacks (Picture No. 16)


Septic tank at OMC filled with sludge, not emptied, disinfected, and filled with soil (Picture No. 17 & 18)


Septic tank at OMC left as such, threat to water stagnation, disease dispersal, and local fauna (Picture No. 19 & 20)

Septic tank at OMC not disinfected, and filled, and marked; Damaged by local residents (Picture No. 21 & 22)

Ditches and Berms around OMC site not graded (Picture No.23).

Borrow material mounds not graded/removed from the site (Picture No. 24)

Ditches & Berms around OMC not filled, leveled or graded

Berms left at back side of OMC (Pictures No.25 & 26)

Ditches at southwestern part of OMC not leveled (Picture No. 27)

Waste, & demolished material not disposed off the site properly (Picture No. 28)

Demolished material at camp site being transported by local residents (Picture No. 29 & 30)

Partially demolished traditional pit latrine at southern part of OMC (picture No. 31, 32 & 33)

Bashikurd 9 cellar pool site filled with soil (Picture No. 34)

Bashikurd 9 mud pit site filled with soil (Picture No. 35)

*[Source: Juma/Bashikurd Gas Field Abandonment Report, TPAO, March 2016]*

Entrance View of the Bashikurd 9 drill site (Picture No. 36)

*[Source: Juma/Bashikurd Gas Field Abandonment Report, TPAO, March 2016]*

View of Bashikurd 3 drill site, berms not leveled (Picture No. 37)

Bashikurd 3 drill well not marked with sign (Picture No. 38)

*[Source: Juma/Bashikurd Gas Field Abandonment Report, TPAO, March 2016]*

Access route condition along main road - OMC (Picture No.39)

Access road condition near drill site (Picture No. 40)

*[Source: Juma/Bashikurd Gas Field Abandonment Report, TPAO, March 2016]*

Condition of access road along main road to OMC (Picture No. 41, 42, 43)

## Annex 2 - Estimated Cost of Remaining Works

| No. | Description of Cost | Unit | Quantity | Unit Price | Cost to Contractor | Total Cost | Budget Justification and Narrative |
|---|---|---|---|---|---|---|---|
| | | | | USD | | | |
| A | Labor / Staff | | | | | | |
| 1 | Site Supervisor | month | 2 | $4,000.00 | $8,000.00 | $8,000.00 | ensuring on-time and effective implementation of deliverables |
| 2 | Security Officer/personnel | month | 2 | $2,000.00 | $4,000.00 | $4,000.00 | ensuring security |
| 3 | Security guards | month | 100 | $600.00 | $60,000.00 | $60,000.00 | |
| | Sub-Total | | | | $72,000.00 | $72,000.00 | |
| B | Heavy Machinery/Equipment | | | | | | |
| 1 | Grader | month | 2 | $4,000.00 | $8,000.00 | $8,000.00 | for grading/scarifying road and left over material |
| 2 | Roller | month | 2 | $3,500.00 | $7,000.00 | $7,000.00 | for compaction of topsoil |
| 3 | Septic Vacuum Pump truck | month | 1 | $1,500.00 | $1,500.00 | $1,500.00 | emptying septic tank |
| 4 | 4 Runner | month | 6 | $800.00 | $4,800.00 | $4,800.00 | movement, management |
| 5 | Dump truck | month | 5 | $3,000.00 | $15,000.00 | $15,000.00 | Delivery of gravel for road |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6 | Excavator | month | 1 | $3,500.00 | $3,500.00 | $3,500.00 | excavating stockpiles, berms and filling of septic tanks |
| 7 | Water tanker | month | 2 | $2,500.00 | $5,000.00 | $5,000.00 | dust control |
| | Sub-Total | | | | $44,800.00 | $44,800.00 | |
| C | Travel & Transportation | | | | | | |
| 1 | Mobilization of machinery | lump sum | 13 | $600.00 | $7,800.00 | $7,800.00 | transportation of heavy machinery |
| 2 | Demobilization of machinery | lump sum | 13 | $0600.00 | $7,800.00 | $7,800.00 | transportation of heavy machinery |
| | Sub-Total | | | | $15,600.00 | $15,600.00 | |
| D | Other Direct Costs | | | | | | |
| 1 | Backfilling/leveling and compaction of the area | | lump sum | $50,000.00 | $50,000.00 | $50,000.00 | |
| 2 | Rough grading of the road for leveling followed by watering and compaction | m2 | 182000 | $6.00 | $1,092,000.00 | $1,092,000.00 | material will be delivered from 35km away to the project site. |
| | Sub-Total | | | | $1,142,000.00 | $1,142,000.00 | |
| | GRAND TOTAL | | | | $1,274,400.00 | $1,274,400.00 | |
| | Percent Share of the total cost | | | | 100% | | |

## Annex 3 – Check list for Environmental Compliance Inspection

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Project: Sheberghan Gas Field Development Project, AEAI Project No. A019-000 | | | | | | | | |
| Site Location: Juma, and Bashikurd | | | | Status during inspection: Phase -1 drilling operation, & construction completed | | | | |
| Inspection date: 01 - 07 Mar 2016 | | | | Inspection Time: 0900 - 1100 Hrs. | | | | |
| Inspected by: Haroon Haleemzai, Environmental Specialist (Credible Construction Company) | | | | | | | | |
| Weather: 03 Mar (Normal Cold, Sunny) | | | | | | | | |
| S# From EMP | Activity/Issue | Impacts | Measures Required as per EMP | Responsibility | Measures Implemented | Compliance | | |
| | | | | | | Yes | No | NA |
| 1.3 | Access Routes | | | | | | | |
| 1.2.1 | Destruction of vegetation cover | Loss of vegetation, land degradation, soil erosion | Measure should be considered to protect vegetation | Contractor | The vegetation cover at camp site and drill sites are disturbed during construction works e.g. embankment construction, and ditch construction | | ✓ | |
| 1.2.1<br>1.2.5 | Loss of top soil | Soil erosion, floods | Top soil should be preserved for reuse | Contractor | Generally top soil is not disturbed. Borrow materials for road construction is transported from Shorjur (located at distance of 35 Km from Sheberghan city). However, the top soil at camp site, and drill sites are disturbed which has | | ✓ | |

| | | | | | | | | |
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| | | | | | not been recovered by back filling and leveling | | | |
| 1.3.2 | Formation of stagnant water pools due to borrowing/quarrying | Pathogen and mosquito habitation | Borrow/ Quarry should be rehabilitated after works completion | Contractor | In front and back side of OMC ditches are not back filled. Stagnant waters pose a threat by providing habitat for parasites and mosquitos | | ✓ | |
| 1.3.2 | Have water bodies been affected? | Damage to natural habitats, and water quality | Precaution should be taken while taking actions near water bodies | Contractor | No effect on water bodies | ✓ | | |
| | Garbage Waste along access route? | Soil, and water contamination | Site should be cleared from debris after completing road construction works | Contractor | waste generation was not observed along access route however at camp site different kind of wastes were observed dispersed and disposed all around. | | ✓ | |
| 1.3.2 | Is there any Interruption to water flow? | Water stagnation, soil erosion, disease dispersal, | | Contractor | The berms, and left over material around camp site, and drilling sites are interruption to natural water flow, and vegetation re-establishment | | ✓ | |
| 1.4.9 | Condition of Access Routes | | | | | | | |
| 1.4.9 | Is the road left in good condition | Road surface erosion due to water stagnation, fine material loss | Road shall be left in good condition. should be graveled, graded, repaired after removing equipment & facilities | Contractor | The road has lost slope, and shows rutting. If left in this condition, It can't sustain the designed life span of 10 years | | ✓ | |

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| 1.4.11 | Abandonment & reclamation of wells | | | | | | | |
| 1.4.11<br>1.4.8 | Is there any facility/structure available at well sites | Potential for accident around abandoned facilities | Facilities should be properly removed from abandoned/reclaimed wells | Contractor | all the facilities are removed by contractor however at some points the HESCO are left as such | ✓ | | |
| 1.4.12 | Is the site graded, graveled, and repaired? | SOP for reclamation of wells to avoid environmental problems | The reclaimed site should be cleared, graded, and graveled | Contractor | The drill site and camp site is graded, however some locations are not repaired e.g. berms, left over material from HESCOs & ditches | | ✓ | |
| 1.4.6 | Abandoned wells demarcated with proper signage | Operator, workers information on temporarily abandoned wells | Well information e.g. operator name, well number | Contractor | The well is sealed with metal but no sign was placed. | | ✓ | |
| 1.4.7 | Is the well abandonment plan submitted | Effective, and efficient implementation, risk management | Gives information on planned well abandonment technology/method | Contractor | The contractor has submitted well abandonment plan, and report | ✓ | | |
| 1.4 | Reclamation of Pits at drilling site | | | | | | | |
| 1.4.11 | Are the septic tanks disinfected, filled with soil, and compacted? | To avoid tank blockage, pathogen infections, health problems | Pits to be disinfected, filled, or emptied prior leaving the site | Contractor | Septic tanks at all the drill sites, and camp site are not disinfected, filled, and compacted. Septic tank at camp site is filled with sludge to mid-level | | ✓ | |
| 1.4.12 | Have mud pits at drilling sites disinfected & covered | To avoid pathogen infections, health problems | Are Pits shall be covered. | Contractor | Two mud pits were excavated at each drill site. which are filled, | ✓ | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | with soil? | | | | graded, and compacted | | | |
| 1.4.12 | Are Berms remains present at site? | Causes interruption to normal drainage | Berms shall be leveled and normal surface drainage restored | Contractor | Berms are not leveled at all the drill sites, and camp site | | ✓ | |
| 1.4.12 | Are stock piles of soil leveled? | Causes interruption to normal drainage | Reserved compiled soil should be spread and leveled in such a way as to prevent compaction. | | Compiles soils are not leveled | | ✓ | |
| 1.4.12 | Natural recovery of local vegetation been disturbed? | Degradation of native vegetation | Natural re-establishment of local vegetation should have not been disturbed by activities occurred. | Contractor | The natural vegetation at camp site, and drill site is usual to be effected during works however no measures are taken on rehabilitation of vegetation | | ✓ | |
| 3.0 | Air Quality | | | | | | | |
| 3.1 | Has contractor complied with air quality control and monitoring requirements of Afghanistan | Local inhabitants health disturbance | The air quality should be kept in good condition before leaving the site | Contractor | Decomposition of waste in front of camp site has caused very bad odor. pit latrine has disturbed the air quality | | ✓ | |
| 6.0 | Hazardous Material | | | | | | | |
| 6.2 | Have chemicals disposed at the site? | High toxicity & potential to degrade/damage local environment e.g. local population, soil & water contamination | Should be disposed of the site at proper location | Contractor | Waste contents could not be assessed as it requires testing | ✓ | | |

| | | | | | | | | |
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| 7.0 | Solid Waste Management | | | | | | | |
| 7.1.1<br>7.4.1 | Is solid waste managed properly at drill sites? | Solid waste be placed in secure covered bins that minimize scattering and the presence of flies, rats, and other vermin. | | Contractor | Solid waste not observed at drill sites | ✓ | | |
| 7.1.1<br>7.4.2 | are all solid waste, rubbish, and trash removed and properly disposed of the site | causes disease disperse by population increase of flies, rats, and other<br>vermin | all solid waste, rubbish, and trash shall be removed and<br>properly disposed of. | Contractor | no measures taken on household waste proper disposal. The decomposition of solid waste has caused bad smell at the camp site | | ✓ | |
| 8.1 | Are lubricants disposed of the site properly? | Soil degradation, and natural habitat disturbance | Hazardous waste e.g. used lubricating oils or radiator<br>coolant, shall be collected and disposed of to a proper location | Contractor | Lubricants spill did not observe at drill sites | ✓ | | |

## Annex 4 – Environmental Management Plan

The following pages contain the Environmental Management Plan for the Sheberghan Gas Development Project.

# Ministry of Mines and Petroleum
# Islamic Republic of Afghanistan

## Juma and Bashikurd Gas Well Drilling and Re-entry Environmental Management Plan

Three Well Re-entry and Drilling Program
Juma-Bashikurd Field
Jawzjan Province

Submitted in Support of Application to the
National Environmental Protection Agency
Islamic Republic of Afghanistan for
Certificate of Compliance

(Date) _____

# Table of Contents

## Acronyms and Abbreviations

| | |
|---|---|
| API | American Petroleum Institute |
| BOP | Blowout Prevention Systems and system components |
| CFR | United States Code of Federal Regulations |
| cm | Centimeter |
| $CO_2$ | Carbon Dioxide |
| DNV | Den Norsk Veritas |
| EMP | Environmental Management Plan |
| EMMP | Environmental Mitigation and Monitoring Plan |
| EU | European Union |
| $H_2S$ | Hydrogen Sulfide |
| HSE | Health, Safety and Environment |
| IMO | International Maritime Organization |
| IP | the Institute of Petroleum |
| IADC | International Association of Drilling Contractors |
| IAGC | International Association of Geophysical Contractors |
| ISO | International Organization for Standardization |
| MERC | Ministry's Monitoring, Evaluation, and Reporting Committee |
| mg/l | Milligrams per Liter |
| $m^3$ | Cubic Meters |
| NEPA | Afghan National Environmental Protection Agency |
| NORM | Naturally Occurring Radioactive Material |
| pCi/gm | Picocuries per Gram |
| SPE | Society of Petroleum Engineers |
| USAID | United States Agency for International Development |

# 1 Definitions

“Afghanistan” means the Islamic Republic of Afghanistan.

“Barrel” means a standard barrel of 42 U.S. gallons (158.9 liters).

“Best Available and Safest Technologies”means the equipment, procedures and practices which an experienced, competent and prudent international Operator would use when engaged in a similar activity under similar circumstances and in accordance with International Oilfield Practices.

“Contractor” means the service company selected and contracted by the Ministry to conduct the physical operations covered by the EMP.

“Fresh Water” means potable water or other water capable of being used for domestic, agricultural, livestock, commercial, or industrial uses.

“Freshwater Zone” means any geologic formation known or likely to contain Fresh Water in usable amounts.

“Hazardous Limit of $H_2S$” means a concentration of hydrogen sulfide equal to or greater than 20 parts per million.

“International Oilfield Practice” means any principle, practice or procedure which is generally applied by the international Hydrocarbons industry as good, safe, efficient and necessary in the carrying out of exploration, development or production operations and shall include, without limitation, any principle, practice or procedure which has been approved by the internationally recognized organizations and is not in conflict with the Laws.

“Laws” means the treaties, laws and regulations of Afghanistan, including, without limitation, the Hydrocarbon Law, the Hydrocarbon Regulations, and the Environmental Protection Law.

“Major Environmental Incident” means (i) fires, explosions and blowouts that occurred during the conduct of Hydrocarbons Operations and/or (ii) significant spills of Oil or other Hazardous Substances.

"Major Health and Safety Incident" means (i) an incident due to Hydrocarbon Operations resulting in death or serious injury; or (ii) catastrophic failure of health and safety equipment used in Hydrocarbon Operations, which results in a Major Environmental Incident.

“Ministry” means the Ministry of Mines and Petroleum of the Islamic Republic of Afghanistan.

“Hydrocarbons” means petroleum and gas and their derivatives.

“Hydrocarbon Operations” means, for purposes of these policies, all physical activity and operations related to the exploration for, development of, and production of Hydrocarbons, including, without limitation, drilling, re-entry, workover, completion of wells, field separation, and transportation to the point of sale or delivery of Hydrocarbons.

“Hydrocarbon Waste” means wastes generated during the conduct of Hydrocarbon Operations, which are uniquely associated with and intrinsic to Hydrocarbon Exploration, Development or Production Operations and include, but are not limited to, produced water, drilling fluids and drill cuttings, well

completion, treatment and stimulation fluids, workover waste, sanitary waste and other substances and materials available for discharge.

“Operator” means the person, legal or natural, conducting Hydrocarbons Operations, including both the person or persons with legal control of such Hydrocarbons Operations and the person or persons actually conducting the Hydrocarbons Operations. In this EMP, the “Operator” is the Ministry.

“Routine Workover Operations” means any of the following: Hydrocarbon Operations conducted on a well with a tree installed: cutting paraffin; removing and setting wellbore equipment that can be removed by wireline operations; bailing sand; swabbing; pressure surveys; scale or corrosion treatment; caliper and gauge surveys; corrosion inhibitor treatment; removing or replacing subsurface pumps; through-tubing logging (diagnostics); wireline fishing; and setting and retrieving other subsurface flow control devices.

“Significant Spill” means any unauthorized discharge of oil, brine or chemical exceeding 0.5 barrels which is in, or likely to enter, water; or any discharge of oil or brine onto land exceeding ten (10) barrels per incident or 0.5 barrels of chemical per incident.

“Subsurface Safety Devices” means any downhole mechanical device which is designed to shut off well flow in the event of an emergency and may consist of either surface or subsurface controlled subsurface safety valves, an injection valve, a tubing valve, a tubing or annular subsurface safety device and any associated valve lock or landing nipple.

“Threshold Limit of $H_2S$” means the acceptable peak concentration of 50 ppm for a single time period of no more than ten minutes if no other measurable exposure occurs during a work shift; otherwise a ceiling of 10 ppm.

# 2 Introduction

This Environmental Management Plan (EMP) is submitted in support of the application of the Ministry of Mines of the Islamic Republic of Afghanistan for a certificate of environmental compliance for the proposed re-entry and workover of the Bashikurd Nos. 3 and 9, and drilling a replacement well, the Juma No. 2A in the Juma/Bashikurd Gas Field, located approximately fifteen kilometers west of the city of Sheberghan, Jawjzan Province. These Hydrocarbon Operations are proposed to be conducted by the Ministry of Mines and Petroleum of the Islamic Republic of Afghanistan, as the legal possessor of the Juma/Bashikurd Field. The Ministry plans to employ a third party contractor to conduct the physical operations involved, including re-entry, drilling, logging, testing, and completion of the described wells. The operations are being financed by a grant from the United States Agency for International Development.

This EMP has been developed in conjunction with the required environmental screening study submitted in support of the Ministry's application for a certificate of compliance.

## 2.1 Applicable Law and Grant Conditions

Pursuant to applicable law and the conditions of the financing grant, all drilling and re-entry activities shall comply with Afghanistan's Environmental Law and USAID's environmental compliance requirements set out at Title 22, Section 216, of the United States Code of Federal Regulations (22 CFR 216). The following summarizes these requirements.

Environmental Law (2007): According to the Environmental Law (2007) of Afghanistan and its implementing regulations, a person or legal entity proposing to carry out a physical project, plan, policy, or activity must to the National Environmental Protection Agency (NEPA) accurate information sufficient to allow NEPA to determine the potential adverse effects and positive impacts of the proposed project, plan, policy or activity. After reviewing the information submitted, and acting on the advice of the EIA Board of Experts, NEPA may authorize the project, plan, policy or activity, with or without conditions, provided that the potential adverse effects of the project, plan, policy or activity on the environment are unlikely to be significant.

If NEPA considers that the potential adverse effects on the environment are likely to be significant, it may require the proponent to submit to NEPA an environmental impact statement or a comprehensive mitigation plan.

An environmental scoping study prepared for the Sheberghan Gas Generation Activity Project (SGGA) funded by USAID[2]. That study has been modified slightly to meet NEPA requirements for the required screening study. The screening study has also been submitted with the Ministry's application. The study concludes that the Juma-Bashikurd project may have potential adverse impacts on the environment, but that they could be adequately managed via adequate mitigation requirements. The Ministry believes that this EMP includes such adequate mitigation requirements.

Article 15 of the Environment Law requires a comprehensive mitigation plan to include:

a) a description of the mitigation measures that will be implemented in order to prevent, reduce or otherwise manage the environmental impacts of a project, plan, policy or activity;
b) a statement of how such mitigation measures will be implemented; and

[2] This scoping study was approved by USAID on 14 January 2013.

c) Any other information prescribed by NEPA.

USAID Requirements, 22 CFR 216: Environmental assessment requirements for USAID-funded projects and programs are prescribed by Title 22, Section 216, United States Codes of Federal Regulations environmental compliance procedures. The environmental scoping study prepared for and approved by USAID concluded that there would be no significant adverse environmental impacts arising from drilling and re-entry activities that could not be mitigated by the implementation of mitigation measures described in the environmental, health, and safety guidelines included in the in the scoping study. Those mitigation measures have been incorporated into this EMP, thereby ensuring this EMP is compliant with USAID requirements.

## 2.2 Structure of the EMP

The EMP is structured in three sections:

- Section 1: Introduction and summary of applicable Afghan law and USAID grant requirements on environmental assessment.
- Section 2: Substantive requirements for environmental mitigation and monitoring for the drilling and re-entry activities.
- Section 3: Implementation requirements, including reporting, and training.

# 3 Environmental Mitigation & Monitoring Plan

## 3.1 General

This Section 2 prescribes the requirements for environmental mitigation and monitoring. The tables in this Section describe the required mitigation measures, the schedule and responsibilities for implementing the mitigation measures, the mitigation monitoring requirements, and reporting requirements.

## 3.2 Reliance on International Standards and Best Practices

In the absence of specific mitigation requirements, the Operator and Contractor shall comply with International Best Practices standards used in the hydrocarbon sector. In carrying out all mitigation shall comply with applicable International Best Practices, which are deemed for purposes of this EMP the standards, codes, certification and certification procedures, practices and guidance documents of internationally recognized standardization and certification bodies and agencies that have been accepted by Hydrocarbon, environmental, safety and health regulators in jurisdictions including the United States of America, the state of Texas, the United Kingdom, Canada, Australia, Norway, or the Netherlands. In the event that any such procedure, practice, or document conflicts with the Hydrocarbon, environmental, safety, or health Laws of Afghanistan and the requirements of such procedure, practice, or document cannot be reconciled with the Laws of Afghanistan, the Laws shall apply.

Except to the extent of any conflict with the relevant Laws of Afghanistan and in the absence of a specific requirement set out in this EMP, the Operator and Contractor shall be considered to have complied with this EMP and to have met International Best Practices if the Operator or Contractor has fully complied with the reference standards used in the jurisdictions listed above, and/or the standards, codes, certification and certification procedures, and guidance documents promulgated by the following organizations:

- International Association of Drilling Contractors (IADC)
- International Association of Geophysical Contractors (IAGC)
- International Oil and Gas Producers Association (OGP)
- American Petroleum Institute (API)
- Society of Petroleum Engineers (SPE).

Appendix A provides sample International Best Practice guidelines for the management of key environmental issues highlighted within this EMP.

| MP 1.0 - Soils, Vegetation and Surface Disturbance | | | | | |
|---|---|---|---|---|---|
| Issue/ Impact | Mitigation | | Monitoring | | Reporting |
| | Description | Schedule & Responsibility | Description | Schedule & Responsibility | |
| 1.1 Impacts to brownfield sites (existing operational areas) | 1.1.1 Mark areas to be cleared or prepared. | Operator - Prior to commencing work. | Observational monitoring of Contractor's compliance with mitigation. | Operator – prior to commencing work. | Operator to prepare a pre-construction Environmental Report confirming compliance with the EMP. MERC to approve report after site monitoring and confirmation of findings. |
| 1.2 Impacts to greenfield sites | 1.2.1 In vegetated areas, remove and stockpile topsoil and stabilize the topsoil storage area, including diversion for storm water. | Contractor - Prior to commencing work. | Observational monitoring of Contractor's compliance | Operator – prior to commencing work. | Operator to prepare a pre-construction environmental |
| | 1.2.2 To the extent feasible, avoid removal of any trees or other | | | | |

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| | large perennial vegetation. | | with mitigation. | | report confirming compliance with the EMP. MERC to approve report after site monitoring and confirmation of findings. |
| | 1.2.3 Avoid damage or alteration to pre-existing operations, such as irrigation ditches and gates, power lines, and fields or other agricultural operations. | | | | |
| | 1.2.4 If damage to or alteration of operations cannot reasonably be avoided, make arrangements with the owner or possessor of the operations for moving the operations to a location where they will not be affected. | | | | |
| | 1.2.5 Where feasible, retain grassed or vegetated areas downslope of operations areas to reduce the velocity of runoff for reduction of erosion and sediment movement | | | | |
| | 1.2.6 After rains or snow melt, inspect the performance of erosion and sediment controls, and maintain or improve such controls if required | Contractor – during operations | Observational monitoring of Contractor's compliance with mitigation. | Operator – periodically during operations | Monthly environmental reporting by the Operator, reviewed and approved by MERC |
| 1.3 Access Routes | 1.3.1 Roads shall be constructed to ensure adequate width and type of construction to accommodate the size and weight of all reasonably anticipated movement of equipment and vehicles. | Contractor - Prior to commencing work | Observational monitoring of Contractor's compliance with mitigation. | Operator – prior to commencing work. | Operator to prepare a pre-construction environmental report confirming compliance |
| | 1.3.2 Access roads shall be designed in such a manner as prevent (i) the flooding of lands adjoining the roads during normal rainfall or snow melt, (ii) causing erosion; and (iii) to the extent practicable, interference with the usual and | Operator - Prior to commencing work | | | |

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| | customary movement of persons, livestock, or wildlife | | | | with the EMP. MERC to approve report after site monitoring and confirmation of findings. |
| | 1.3.3 Access roads shall be designed to avoid, to the extent practicable, (i) passage closer than 500 meters of any established habitations, (ii) commercial buildings in use by persons other than Operator personnel or Ministry personnel, or (iii) military or law enforcement facilities; | Contractor - Prior to commencing work | | | |
| 1.4 Abandonment and Reclamation of wells | 1.4.1 Plug and abandon all well bores and remove all facilities not taken over by the Ministry or another Operator on completion of operations, | Contractor – at completion of operations | Operator inspection and approval of well sites. | Operator – at completion of operations. | Operator to prepare an environmental close-out report. Report to be reviewed and approved by MERC. |
| | 1.4.2 Clear all obstructions created on the abandoned area on which operations were conducted. | | | | |
| | 1.4.3 Assure down-hole isolation of Hydrocarbon zones and protection of Freshwater Zones. | | | | |
| | 1.4.4 Ensure that no production well mechanically capable of producing Hydrocarbons is plugged and abandoned until the Operator has determined that the well has no future value or alternate use. | | | | |
| | 1.4.5 The Contractor, as part of plugging and permanent abandonment of a well, shall cut the casing at least two meters below the estimated restored surface level and run cement to a depth of at least three meters below the top of the cut casing. The top of the casing shall be permanently sealed by a steel plate welded onto the top of the casing and marked so as to indicate clearly that removal of the welded plate may result in injury or death. | | | | |

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| | 1.4.6 All temporarily abandoned wells shall have a metal sign affixed to the wellhead or tree clearly indicating the name of the Operator, and name and number of the well. | | | | |
| | 1.4.7 Prior to commencing abandonment operations, the Contractor shall submit to the Operator a written plan for abandonment. | | | | |
| | 1.4.8 Remove all temporary structures at locations used for Hydrocarbon Operations, except those designated by the Operator to remain in place. | | | | |
| | 1.4.9 Field roads used shall be left in good and usable condition, and the Contractor shall gravel, grade, and repair the roads after removing all Contractor equipment and facilities | | | | |
| | 1.4.10 At completed wells ready for production or temporarily abandoned, Contractor shall leave the well pad, laydown and turning areas, and work areas smoothed and in good condition for subsequent operations. | | | | |
| | 1.4.11 Contractor's camp location shall be cleared of equipment and temporary structures, subject to Operator approval, and either reclaimed or left in good condition for subsequent operational use, as directed by the Operator. However, septic system soak pits and waste burn pits shall be disinfected with lime or other suitable disinfectant, knocked in, filled with subsoil, compacted to prevent settling, and covered with not less than 50 centimeters of topsoil. Concrete septic tanks shall be emptied, disinfected with lime or other suitable disinfectant, filled with subsoil, compacted to prevent settling, and their location marked. | | | | |

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| | 1.4.12 At permanently plugged and abandoned wells and at any other locations used for Hydrocarbon Operations and not reserved by the Operator for future use shall be reclaimed as follows:<br>• Pits shall be covered.<br>• All solid waste, rubbish, and trash shall be removed and properly disposed of.<br>• Berms shall be leveled and normal surface drainage restored unless special measures are required to prevent soil erosion.<br>• Graveled and other compact areas shall be ripped to a sufficient depth to permit water and air penetration.<br>• Reserved topsoil, if any, shall be spread and leveled in such a way as to prevent compaction.<br>• To the extent practicable, the location shall be seeded with plants native to the location, or left in such a condition that natural re-establishment of local vegetation shall occur. | | | | |

| MP 2.0 – Drilling and Completion |
|---|

| Issue/ Impact | Mitigation | | Monitoring | | Reporting |
|---|---|---|---|---|---|
| | Description | Schedule & Responsibility | Description | Schedule & Responsibility | |
| 2.1 Blow outs | 2.1.1 Blowout prevention systems and system components (BOP) shall be designed, installed, used, maintained and tested to assure well control. | Contractor – prior to the commencement of operations and during operations | Review and approve designs and Contractor's test results | Operator to approve designs prior to commencement of operations | Contractor to provide Operator with regular test results during operations. |
| | 2.1.2 A BOP system shall consist of an appropriate number of hydraulically operated preventers equipped with either pipe, blind or blind-shear rams, and shall be arranged in the stack to assure well control under anticipated conditions. The BOP system may also include an annular (bag-type) preventer. | | | | |
| | 2.1.3 The rated working pressure of any BOP component shall exceed the anticipated wellhead pressure to which it may be subjected. | Contractor – during operations | Regular inspection of operations. | Operator to make periodic inspections during operations | Contractor to report inspection findings to Operator with Morning Report. |
| | 2.1.4 BOP pressure testing shall be conducted at all customary intervals prior to and during drilling operations in accordance with International Oilfield Practice. | Contractor – during operations. | Regular inspection of operations. | Operator to undertake periodic inspections during operations. | Test results to be reported to MERC. |
| | 2.1.5 Prior to conducting high pressure tests, BOPs shall be subjected to 100 bars low pressure test. BOPs shall then be subjected to a high pressure test with water to the casing/wellhead pressure. Subsequent pressure tests shall be to the maximum anticipated | | | | |

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| | wellhead pressure. Annular type BOPs shall be tested to 70 percent of its rated working pressure. | | | | |
| 2.2 Tubing and Well Head Equipment | 2.2.1 Tubing - Contractor shall:<br>• Ensure that all tubing has the necessary strength and pressure integrity and is otherwise suitable for its intended use; and<br>• Conduct integrity testing in the event of prolonged operations. | Contractor – during the operations | Review of designs, site inspections, and review of test data | Operator to review and approve designs prior to commencement of operations.<br><br>Operator to undertake site inspections and review of test data | Operator to report test data to MERC |
| | 2.2.2 All wells shall be completed with tubing installed unless an exception to such requirement has been approved by the Operator. | | | | |
| | 2.2.3 Wellhead Equipment - Contractor shall:<br>• Ensure that wellheads are equipped for pressure monitoring and that such monitoring occurs on a regular basis; and<br>• Ensure that the wellhead, tree and related equipment have a pressure rating that is greater than the applicable shut-in tubing pressure. | | | | |
| | 2.2.4 The wellhead, tree and related equipment have to be designed, installed and maintained to achieve full pressure control. | | | | |

| MP 3.0 – Air Quality | | | |
|---|---|---|---|
| Issue/ | Mitigation | Monitoring | Reporting |

| Impact | Description | Schedule & Responsibility | Description | Schedule & Responsibility | |
|---|---|---|---|---|---|
| 3.1 Air quality | 3.1.1 Comply with all air quality control and monitoring requirements of Afghanistan and applicable International Oilfield Practices (see Appendix A). | Contractor – during operations | Reviews of Operator's compliance with EMP | Operator to undertake periodic site reviews | Monthly environmental reporting by the Operator, reviewed and approved by the MERC |
| | 3.1.2 Minimize the venting or flaring of gaseous Hydrocarbons and associated gases. | | | | |
| | 3.1.3 Use gaseous Hydrocarbons that would otherwise be vented or flared for operations fuel to the greatest extent practicable. | | | | |
| | 3.1.4 When economically feasible, use low sulfur and low aromatic diesel fuel for generators and other equipment, and employing appropriate pollution control devices. | | | | |

| MP 4.0 – Water Management | | | | | |
|---|---|---|---|---|---|
| Issue/ Impact | Mitigation | | Monitoring | | Reporting |
| | Description | Schedule & Responsibility | Description | Schedule & Responsibility | |
| 4.1 Produced Water Discharge | 4.1.1 Prior to disposal of produced water the Operator shall treat it to prevent oil and condensate from entering a pit. | Contractor – during operations. | Regular inspection of operations. | Operator to undertake periodic inspections | Monthly environmental reporting by Operator, |

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| | | | | during operations. | reviewed and approved by MERC. |
| | 4.1.2 Produced water may be disposed of as follows:<br>a) Injection into a well approved by Ministry;<br>b) Evaporation/percolation in a properly permitted lined or unlined pit;<br>c) For produced waters with less than 5,000 mg/l total dissolved solids, disposal by road spreading on roads outside sensitive areas, if authorized by the Ministry. Road spreading shall not result in pooling or runoff of Produced Water, and shall not result in an average increase or more than 15% in soil salinity in the soils within 3 meters of the edge of the roadway on which Produced Water is spread. | Contractor – during operations.<br>Contractor to test quality of produced water not less than each ten days.<br>Contractor to establish, by international standard testing, average soil salinity within 3 meters of roadway prior to road spreading, and submit tests results to Ministry with request for spreading. | Regular inspection of operations and review of test results | Operator to undertake periodic inspections during operations and review test results. | Monthly environmental reporting by the Operator, including water quality test results, reviewed and approved by the MERC. |
| | 4.1.3 Water produced during Hydrocarbons Operations may be | Operator | Review of re- | Operator to | Monthly |

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| | reused for enhanced recovery; drilling and other purposes in a manner consistent with the International Oilfield Practice (see Appendix A). | compliance with International Oilfield Practice. | use methods. | approve re-use methods prior to re-use | environmental reporting by the Operator, including water quality test results, reviewed and approved by the MERC. |
| 4.2 Drilling Fluids. | 4.2.1 The use of closed loop systems for the handling of drilling fluids is encouraged. | Contractor – during operations. | Operator - Review and approve designs | Operator to approve designs prior to commencement of operations | None |
| | 4.2.2 If the use of a closed loop system is not practicable, above- ground tanks or excavated pits shall be used. Pits shall be constructed, maintained, and closed in compliance with Item 4.3. | Contractor – during operations. | Regular inspection of operations. | Operator to undertake periodic inspections during operations. | Monthly environmental reporting by the Operator, reviewed and approved by MERC. |
| | 4.2.3 The Contractor shall report to the Operator the content of drilling fluids and additives, including concentrations, and shall provide materials data sheets for each drilling fluid component. | Contractor – during operations. | Review of test results | Operator to review test results. | Monthly environmental reporting by the Operator reviewed and approved by the |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | MERC. |
| | 4.2.4 Drilling fluid composition shall conform to international best practice toxicity limits. | Contractor – during operations. | Review of test results | Operator to review test results. | Monthly environmental reporting by Operator reviewed and approved by MERC. |
| | 4.2.5 If drilling fluid residuals after dewatering are not disposed of as pit contents residuals, drilling fluid residuals exceeding applicable limits for toxicity established by Item 4.2.4 shall be removed and disposed of by a person or firm that is a licensed waste management company, or, if such a licensed disposal is not reasonably available, as directed by MERC or the NEPA. | Contractor to engage a waste management specialist. | Regular inspection of site waste management practices. | Operator to undertake periodic inspections during operations. | Monthly environmental reporting by the Operator reviewed and approved by the MERC. |
| | 4.2.6 Drilling fluids or drilling fluid residuals not exceeding toxicity limits may be disposed of by burial at the drill-site. | Contractor – during operations. | Review of test results and approval of burial site location and conditions. | Operator to review test results and approve burial site. | Monthly environmental reporting by Operator reviewed and approved by MERC. |
| 4.3 Reserve, Storage, Settling, and | 4.3.1 Pits used for conduct of Hydrocarbons Operations shall be constructed and operated to prevent communication with surface or ground water or contamination of soil | Contractor - Prior to commencing | Review pit location and | Operator to review pit | Monthly environmental |

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| Other Pits | resources through seepage, flooding, or other release of materials. | work and during operations. | design and inspection of pit during operations. | design and undertake periodic inspections. | reporting by Operator reviewed and approved by MERC. |
| | 4.3.2 Pits should be constructed in compliance with the Laws and International Oilfield Practice (see Appendix A for best practice guidelines), including assurance of:<br>a) Sufficient size for adequate storage until closure, taking into consideration historical precipitation patterns;<br>b) Such depth that the bottom does not penetrate ground water, or such that the pit contents do not adversely impact ground or surface water;<br>c) That berm height, slope and materials are structurally sound and the pit integrity is not compromised by terrain or breached by heavy rains, winds, seepage, or other natural forces;<br>d) Adequate design if a salt section is anticipated or oil-based muds are used during a drilling program;<br>e) Where applicable, adequate fencing, netting, caging and/or any other method to secure a pit to protect the public, domestic animals, and wildlife. | | | | |
| | 4.3.3 All production pits, including pits used for skimming, settling, storage and/or evaporation of produced water, shall be adequately lined with natural or synthetic materials that are compatible with expected pit contents. Liners are not required if Operator demonstrates through natural clay testing that the soil in a pit is impermeable. | | | | |
| | 4.3.4 Special purpose pits such as blowdown and basic sediment pits, with exception of emergency pits constructed during initial response to spills, or flare pits | Contractor - during | Review pit location and | Operator to review pit | Monthly environmental |

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| | where there is no risk of condensate accumulation, shall be lined. | operations. | design and inspection of pit during operations. | design and undertake periodic inspections. | reporting by Operator, reviewed and approved by MERC. |
| | 4.3.5 Upon completion of Operations during which pits have been used, the Contractor shall close all pits within sixty days of cessation of their use, in accordance with the following procedures:<br>a) All contents of the pit shall be dewatered, provided that if weather conditions do not allow dewatering to be completed by evaporation within sixty days, the Operator may allow such further time as is reasonable if the pits are protected with appropriate signs, as prescribed by the MERC or NEPA, posted at the pit warning of the applicable hazards;<br>b) The contents of the pit are tested and the test reports submitted to the Ministry;<br>c) Drilling fluids, drilling fluid components, and liquid Hydrocarbons have been recovered for reuse or other appropriate disposition to the greatest degree practicable;<br>d) Prior to closure the residual contents of the pit have been mixed with subsoil or inert materials and compacted; and<br>e) Pit residual contents are covered with not less than one meter of subsoil, compacted, and covered with available topsoil. | Contractor – during operations. | Inspection of pit site closure and restoration. | Operator to inspect pit after closure and approve pit closure. | Operator to prepare site completion report to be approved by MERC. |
| | 4.3.6 Residual pit contents exceeding applicable limits for toxicity established by Item 4.2.4 shall be removed and | Contractor to | Regular | Operator to | Monthly |

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| | disposed of by a person or firm that is a licensed waste management company, or, if such a licensed disposal is not reasonably available, as directed by MERC or NEPA. | engage a waste management specialist during Operations. | inspection of site waste management practices. | undertake periodic inspections during operations. | environmental reporting by Operator, reviewed and approved by MERC. |
| 4.4 Ground water supply and protection | 4.4.1 If the Ministry does not designate a groundwater source, the Operator may, on approval of the Ministry, procure groundwater for Hydrocarbon Operations by purchase from a third party or by drilling water supply wells. | Contractor – during operational period. | Approval of permits | Ministry to review permits prior to commencement of extraction | Monthly environmental reporting by Operator, reviewed and approved by Ministry. |
| | 4.4.2 If the Operator or Contractor proposes to drill water supply wells, it shall submit to the Ministry a request for approval with the following information:<br>a) A plan depicting the geographical coordinates of the proposed well or wells;<br>b) The depth and thickness of the water productive zone of the geologic horizon or stratum and depth of the proposed source of the water;<br>c) The amount of water to be extracted from the proposed well or wells;<br>d) The predicted quality of the water to be extracted;<br>e) Data from the Water Resources division of the Afghan Geological Survey, in the form and content required by the Ministry, showing the following:<br>f) The depth and thickness of the water productive zone | Operator – during operations. | Review of well drilling request. | Ministry to review and approve request prior to the commencement of drilling. | Monthly environmental reporting by Operator, reviewed and approved by Ministry. |

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| | of the geologic horizon or stratum, of the proposed source of the water, and the areal extent of the water productive zone;<br>g) The estimated quality and volume of water that could probably be produced from the proposed well;<br>h) The location of all known wells within three kilometers currently producing water from the zone that is the proposed source of the water;<br>i) A statement of the potential impact of the withdrawal of the volume of water proposed on other users of that water source. | | | | |
| | 4.4.3 The Operator's proposed design of the well, including specifically the means of assuring that the operation of the well will not contaminate, diminish, or otherwise adversely affect water-productive or Hydrocarbon productive zones expected to be encountered in the proposed well. | Operator – during operations. | Inspection of wells | Ministry to undertake periodic monitoring during the operations. | Monthly environmental reporting by Operator reviewed and approved by Ministry. |
| | 4.4.4 The Operator shall, prior to commencing Hydrocarbon Operations to drill a new well or to re-enter or deepen an existing well:<br>a) Obtain from the Water Resources Division of the Afghan Geological Survey, the depth, thickness, and physical characteristics of all known Freshwater Zones;<br>b) Case and cement any well drilled, re-entered, or worked over during Hydrocarbon Operations in such as manner as to protect any Freshwater Zones identified by the Afghan Geological Survey from | Operator – during operational period. | Inspection of wells and review of well casing integrity tests. | Ministry to undertake periodic monitoring during the operations phase. | Monthly environmental reporting by Operator reviewed and approved by Ministry. |

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| | contamination or other damage, in accordance with International Best Practice casing and cementing requirements (see Appendix A); and<br>c) In any well that is already cased, perform such tests and procedures to assure that the existing casing and cementing is adequate to protect any Freshwater Zone identified by the Afghan Geological Survey. | | | | |
| | 4.4.5 The Operator shall, in conducting Hydrocarbon Operations, monitor the results of drilling or re-entry operations in order to detect Freshwater Zones, and take all reasonable steps, through the mud program, casing and cementing, or otherwise to protect Freshwater Zones detected. | Operator – during operations. | Review of monitoring results. | Ministry to review monitoring results throughout operations. | Monthly environmental reporting by Operator, reviewed and approved by Ministry. |
| | 4.4.6 The Operator shall regularly monitor, either directly, in cooperation with the owners or operators thereof, or through governmental bodies with jurisdiction for operating or monitoring thereof, any Fresh Water wells that it reasonably believes may be affected by Hydrocarbon Operations. | | | | |
| 4.5 Surface Water Supply and Protection | 4.5.1 Prior to use of water for Hydrocarbon Operations from a surface source, Operator shall obtain:<br>a) The express written consent of the owner, and if different from the owner, the lawful current user or users of such source;<br>b) The express written authorization of the Ministry; and<br>c) The express written authorization of all governmental authorities with lawful jurisdiction. | Operator – prior to the commencement of operations. | MERC permits and authorizations | Ministry to review permits and authorizations prior to extraction of water. | None. |
| | 4.5.2 In addition to taking all actions described in the EMP related to the prevention of pollution and erosion caused | Contractor– during | Regular inspection of | Operator to undertake | Monthly environmental |

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| | by or associated with Hydrocarbon Operations, the Contractor shall take all further steps available to prevent the discharge of drilling fluids, produced water, liquid Hydrocarbons, chemicals, and other toxic or contaminating substances into any body of surface water or permanent or seasonal wetlands, or into drainages of any body of surface water or permanent or seasonal wetlands. | operations. | operations. | periodic inspections during operations. | reporting by Operator, reviewed and approved by MERC. |
| 4.6 Site Drainage | 4.6.1 Drill-sites, well locations, and storage areas for liquid Hydrocarbons or produced water shall be surrounded by impermeable berms of sufficient height and design to:<br>a) Prevent the encroachment of storm water runoff to enter the location;<br>b) Contain the maximum amount of liquid Hydrocarbons, drilling fluids, or produced water that would reasonably be anticipated to be discharged or released during a period of one week in the event of (i) loss of well control, (ii) overflow or rupture of any storage, reserve, or settling pit or tank, or (iii) spill of drilling fluids, chemicals, or other substances; and/or<br>c) Contain an amount of fluids equal to the volume of the largest storage tank or structure at the location. | Operator – during operations. | Regular inspection of drill sites | Operator to undertake periodic inspections during operations. | Monthly environmental reporting by Operator, reviewed and approved by MERC. |

| MP 5.0 – Noise Management | | | | | |
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| Issue/ Impact | Mitigation | | Monitoring | | Reporting |
| | Description | Schedule & Responsibility | Description | Schedule & Responsibility | |

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| 5.1 Occupational health | 5.1.1 Workers exposed to high levels of noise should be provided with appropriate noise protection devices for ears. | Contractor – during operations | Reviews of Contractor's compliance with EMP | Operator to undertake periodic site inspections | None |

| MP 6.0 – Hazardous Materials | | | | | |
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| Issue/ Impact | Mitigation | | Monitoring | | Reporting |
| | Description | Schedule & Responsibility | Description | Schedule & Responsibility | |
| 6.1 Mud Program | 6.1.1 The quantities, characteristics, use and testing procedures of drilling mud and the related drilling procedures shall be designed and implemented to prevent the loss of well control and to safeguard hole conditions necessary for proper evaluation of the formation. | Operator – prior to the commencement of operations and during | Daily review by Operator during operations, and more | Operator to undertake regular, unannounced inspections | Operator to provide mud program plan prior to commencement |

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| | | operations | frequently during work in high pressure or potentially high pressure formations, and during any open hole operations. | during operations. | of operations, and reports on tests, changes in program with Morning Report |
| | 6.1.2 Drilling mud shall be properly conditioned and circulated in accordance with International Oilfield Practice (see Appendix A). | Operator – during operations. | Regular inspections | | |
| | 6.1.3 The Contractor shall maintain inventories of mud, mud materials and additives at the drill site sufficient to maintain well control at all times. | Contractor – during operations. | Review of inventories and materials. | | |
| | 6.1.4 Mud analysis and monitoring equipment shall be maintained on the drilling rig at all times and mud tests shall be performed as conditions warrant. | Operator – during operations. | Inspection of testing equipment. | | |
| | 6.1.5 Mud testing shall be conducted in accordance with International Oilfield Practice and shall include mud density, viscosity, gel strength, and such other tests as the Operator | Operator – during | Review of test results. | Operator to undertake a monthly review | |

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| | deems necessary. | operations. | | of results. | |
| | 6.1.6 A mud-gas separator and degasser shall be installed in the mud system after the setting of surface casing. This equipment shall be maintained for use throughout the further drilling of each well. | Contractor – during operations. | Regular inspection of operations. | Operator to undertake periodic inspections during operations. | |
| 6.2 Chemical Storage | 6.2.1 Contractor shall:<br>a) Store hazardous chemicals that require special handling or are toxic to humans (acids, detergents, etc.) in safe facilities with limited access;<br>b) Record the general quantity of all such chemicals; and<br>c) Mark points of storage of chemicals and their qualities on storage area plans at each storage site. | Contractor – during operations. | Inspections of hazardous materials management practices | Operator to undertake periodic inspections during operations. | Monthly environmental reporting by Operator reviewed and approved by MERC. |
| | 6.2.2 Hazardous Materials Management Plans and Material Safety Data Sheets (MSDS) shall be posted in a conspicuous location readily accessible to emergency response authorities and shall also be provided to such authorities. | Contractor – during operations. | Inspections of plans and locations of MSDS. | Operator to undertake periodic inspections during operations. | None. |
| 6.3 NORM | 6.3.1 The Contractor shall monitor cuttings and produced water to determine the presence of material containing naturally occurring radioactive material (NORM). | Contractor – during operations. | Review of test results | Operator to review test results monthly. | Monthly environmental reporting by Operator |
| | 6.3.2 If levels above those stated below are detected, the Contractor | Contractor – | Review of | Operator to | |

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| | shall record the depth and formation from which the materials appear to occur, and attempt to isolate cuttings and produced water from such formation, and notify the Operator for approval to dispose of the NORM. | during operations. | test results | review test results monthly and approve any waste disposal methods | reviewed and approved by MERC. |
| | 6.3.3 The Contractor is not required to notify the Ministry, isolate or specially dispose of cuttings, produced water, or other Hydrocarbon waste material if the material contains, or is contaminated at, concentrations of:<br>a) 30 picocuries per gram (pCi/gm) or less of radium-226 or radium-228 in:<br>I. Soil, averaged over any 100 square meters ($m^2$) and averaged over the first 15 centimeters (cm) of soil below the surface; or<br>II. Other media; or<br>b) 150 pCi or less per gram of any other NORM radionuclide in:<br>I. Soil, averaged over any 100 $m^2$ and averaged over the first 15 cm of soil below the surface, provided that these concentrations are not exceeded; or<br>II. Other media provided that these concentrations are not exceeded. | Contractor – during operations. | Review of test results | Operator to review test results monthly. | |

| MP 7.0 – Waste Management | | | | | |
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| Impact/ Issue | Mitigation | | Monitoring | | Reporting |
| | Description | Schedule & Responsibility | Description | Schedule & Responsibility | |
| 7.1 General Waste Management | 7.1.1 The Contractor shall store, transport and dispose of all Hydrocarbons Waste and other waste in such a manner as not to cause damage to life, health, property, underground or surface sources of fresh, potable water or water useful for other purposes, cultural heritage sites and natural monuments, or endanger the wellbeing of the employees of the Contractor, Operator, or members of the public. | Contractor – prior to the commencement of and during operations | Regular inspection of work site. | Operator to undertake periodic inspections during operations. | Monthly environmental reporting by Operator reviewed and approved by MERC. |
| | 7.1.2 Where practicable, the Contractor should take measures to recycle Hydrocarbons Waste. | Contractor – during operations. | Inspection of site waste management practices. | | |
| 7.2 Hydrocarbon Waste Disposal Plan | 7.2.1 Prior to the commencement of Hydrocarbon Operations, the Contractor shall submit a hydrocarbons waste disposal plan to the Operator for approval. | Contractor – prior to the commencement of operations | Review of waste disposal plan | Operator to review and approve waste disposal plan. | None. |
| | 7.2.2 No disposal of Hydrocarbons Waste shall take place unless until the plan is approved. | | | | |
| | 7.2.3 A proposed Hydrocarbons Waste disposal plan shall | | | | |

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| | include the following:<br>a) A description of procedures for controlling and disposing of all Hydrocarbons Waste that is likely to be generated in the course of the proposed Hydrocarbons Operation;<br>b) A description of all Hydrocarbons Wastes and their estimated quantities to be treated, transported, handled, stored and disposed of during proposed Hydrocarbons Operations and the type of facilities to be used for each activity, including a brief flow diagram of the treatment, neutralization processes and description of the methods used; and<br>c) Any other relevant requirement reasonably requested by the Operator relating to disposal of Hydrocarbons Waste or other kind of waste. | | | | |
| 7.3 Hydrocarbon Waste Injection | 7.3.1 No injection of Hydrocarbon Waste or any other materials, including separated $H_2S$, $CO_2$, or other toxic or corrosive substances, into the subsurface without the prior written consent of the Ministry pursuant to a written application and plan that clearly identifies:<br>a) The name, description and depth of the formation into which Hydrocarbons Waste is to be injected;<br>b) Description and depth of all underground sources of fresh, potable water and water for hydro-therapeutic use that may be affected by the proposed operation;<br>c) Where practicable, a chemical analysis of the water in the injection formation and the fracture pressure or fracture gradient of the injection formation;<br>d) A base plan covering the area of the proposed Hydrocarbons Waste injection well(s) showing the location of each proposed well, the purpose of the well, i.e. disposal or injection and the location of all | Operator – during operations. | Review and approval of waste injection plan. | Ministry to review and approve plan prior to the commencement of any injection operations. | Operator to prepare Plan. |

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| | Hydrocarbons wells;<br>e) Where practicable, a resistivity log, run from the bottom of the surface casing to total depth of the disposal/injection well or wells;<br>f) A full description of the casing in the Hydrocarbons Waste injection well(s) with a schematic drawing showing all casing strings with cement quality and tops;<br>g) A diagram of the surface facility showing all pipelines and tanks associated with the system;<br>h) A listing of all sources of fluid, by well, to be injected;<br>i) The estimated minimum and maximum amount of fluid to be injected daily with anticipated wellhead injection pressures;<br>j) Any other relevant requirement reasonably requested by the Ministry relating to Hydrocarbons Waste injection. | | | | |
| | 7.3.2 The Operator or other person injecting shall:<br>a) Ensure that all wells are designed, constructed, cased, cemented and maintained with due regard to International Oilfield Practices and to protect adequately underground and surface sources of fresh, potable water or water useful for other purposes;<br>b) Carry out a pressure integrity test in each injection well every two years. The results of these tests shall be reported to the Ministry. The Operator shall notify the Ministry one week prior to conducting the periodic test to allow the Ministry to attend and witness the test, if it so desires. In lieu of a pressure integrity test, an Operator shall monitor the pressure in the casing, tubing and annulus during injection operations and record it on a monthly basis. The Operator shall report this information annually to the Ministry. | Operator or other person injecting – prior to the commencement of injection and during the operations. | Review of injection well design<br><br>Review of testing. | Ministry to review and approve designs prior to the commencement of operations<br><br>Ministry to review test results | Monthly environmental reporting by Operator reviewed and approved by Ministry. |

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| | c) Report any significant changes in the operating wellhead injection pressures or other monitoring data that might indicate a defect in pressure integrity, to the Ministry within 24 hours of discovery along with a description of actions being taken by to correct the problem. | | | | |
| 7.4 Solid Waste Disposal | 7.4.1 The Contractor shall assure that solid waste at all locations used for Hydrocarbon Operations shall be collected and disposed of in a safe and sanitary manner that contains it to the locations and prevents scattering. | Operator – during operations | Regular inspection of operations site. | Ministry to undertake periodic inspections during operations. | Monthly environmental reporting by Operator reviewed and approved by MERC. |
| | 7.4.2 Solid waste shall be handled in the following manner:<br>a) Solid waste shall be placed in secure covered bins that minimize scattering and the presence of flies, rats, and other vermin.<br>b) If such service is available, the Contractor shall arrange for the collection and disposal of waste at a suitable landfill or other disposal site at least weekly. If such service is not available, solid waste may be burned in a pit constructed to minimize the scattering of waste, fire risk, and offensive smells to any nearby habitations.<br>c) If any persons in the area of operations are gathering solid waste or rubbish for recycling or reuse, the Contractor shall permit them, in a manner consistent with good security practices, to gather solid waste or rubbish generated by Hydrocarbon Operations. The Contractor is encouraged, but not required, to sort recyclable solid waste or rubbish (for example, plastics) to assist such persons.<br>d) Hazardous waste, such as used lubricating oils or radiator coolant, shall be collected and disposed of at a | | | | |

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| | licensed disposal facility. If no such facility is reasonably available, such materials may be disposed of in drill fluid pits or tanks for later disposal with residual drill fluids.<br>e) The Contractor shall prohibit its personnel from dropping or throwing any rubbish, cigarettes or other waste from vehicles or onto the ground and shall keep its operational locations, including road, free from trash and rubbish. | | | | |

| MP 8.0 – Spill Prevention and Response | | | | | |
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| Issue/ Impact | Mitigation | | Monitoring | | Reporting |
| | Description | Schedule & Responsibility | Description | Schedule & Responsibility | |
| 8.1 Spill Contingency Plan | 8.1.1 The Operator shall submit to the MERC a spill contingency plan for any Hydrocarbon Operation that could potentially result in a spill of Hydrocarbons, chemicals, or produced water. A spill shall include the uncontrolled release of gaseous Hydrocarbons, $H_2S$, $CO_2$, or other potentially toxic or corrosive gases. | Operator – prior to the commencement of operations. | Review and approval of plan. | MERC to review and approve plan prior to commencement of operations. | Operator to prepare plan. |
| | 8.1.2 The proposed Spill Contingency Plan shall include the following, if applicable:<br>a) A map of the area of operations showing the location of proximal population centers, special ecological zones and protected natural territories, potential storage and disposal sites for contaminated fuel, and Hydrocarbons Waste and chemicals;<br>b) A range of worst case spill scenarios that may conceivably arise during Hydrocarbons Operations, including the type of failure, volume, rate direction of flow and containment locations, containment, dispersal or removal;<br>c) The identification, location and general inventory of spill response equipment and a list of trained personnel | | | | |

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| | available for initiating response and procedures to be employed in responding to continuous oil discharges and spills of short duration and for reporting spills to the Ministry;<br>d) Description of simulated training exercises used by the Operator to verify response times from equipment and personnel locations to each facility of the Operator where spills are most likely to occur or when special ecological conditions exist;<br>e) A written dispersant plan including a list of dispersants that may be used, if applicable, and an assessment of their effectiveness when applied to different situations and a summary of their toxicity, chemical composition and properties if available;<br>f) A procedure for inspecting oil spill response facilities, supplies and equipment, along with the manner of record keeping of these inspections;<br>g) A list of names, company positions or job responsibilities, addresses, phone and facsimile numbers and electronic mail address of responsible employees of the Operator;<br>h) Appropriate containment and /or diversionary structures or equipment to prevent discharged oil or other substances from escaping further to surface waters or on the land surface, including containment for storage tanks and equipment;<br>i) The telephone number of the Operator's spill response coordinator and other persons who will act as coordinator in the absence of the spill response coordinator;<br>j) The procedure to be used by the Operator to ensure at least one person trained in appropriate spill response is at a facility at all times to avoid delay in initial response | | | | |

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| | and notification;<br>k) A list of local and national government personnel, provided by the Ministry after approval of the spill contingency plan, including their phone numbers, who will participate in on-scene investigation and observe spill clean-up activities, as well as coordinate with any relevant governmental entities; and<br>l) Any other relevant requirement reasonably requested by the Ministry. | | | | |
| | 8.1.3 The Spill Contingency Plan shall be reviewed and updated as necessary by the Operator or when required by the Ministry. | Operator – during operations. | Review and approval of plan. | MERC to review and approve updated plan as and when required. | Operator to prepare updated plan. |
| | 8.1.4 All modifications to a spill contingency plan that might materially affect the Operator's response capabilities must be approved by the MERC. | | | | |
| 8.2 Notice of a Significant Spill | 8.2.1 The Operator shall, as soon as is practicable but in no event later than 24 hours of discovery of any Significant Spill, provide an oral or written notice to the MERC and NEPA. | Operator – during operations. | Inspection of significant spills | Ministry to undertake inspections in the event of a significant spill. | Reporting of spills to MERC and NEPA. |
| | 8.2.2 Oral notices shall be followed by prompt written notices to the Ministry. The notice of a Significant Spill shall contain the following information:<br>a) The location(s) of the spill(s) by well number or geographical coordinates;<br>b) The estimated volume of spillage and the nature of the spillage (oil, produced water, acid, gases, or other materials that are identified as having a negative impact on the environment);<br>c) The status of the Operator's response at the time of first notice. | | | | |

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| | 8.2.3 In addition to the notice of a Significant Spill required of this article, the Operator shall submit periodic monitoring reports to the Ministry concerning Significant Spills until it is determined that a harmful quantity of oil or other dangerous substances is no longer present. | Operator – during the operations. | Review and approval of reports. | MERC to review and approve reports during operations. | Monthly environmental reporting by the Operator reviewed and approved by the MERC. |
| 8.3 Spill Response and Clean-up procedures | 8.3.1 The Operator shall take immediate measures to contain and clean any spill after its discovery according to an approved spill contingency plan, especially the spillage of oil, produced water, or chemicals into any water body or drainages. | Operator – during the operations. | Inspection of significant spills | Ministry to undertake period inspections of significant spills. | Monthly environmental reporting by the Operator reviewed and approved by the MERC. |
| | 8.3.2 The Operator may use alternate procedures for containment, mitigation or cleanup, including chemicals, absorbents and other materials, if the alternate procedure meets the objectives of the spill contingency plan. | | | | |
| | 8.3.3 The MERC and NEPA shall allow the Operator to take immediate measures to contain and clean any spill, unless it is determined that the Operator is unable to implement the spill contingency plan approved by the Ministry or an alternate plan that addresses the special conditions at the spill site. | | | | |
| | 8.3.4 In the event of a determination of an Operator's inability to act, the NEPA may assume management and implementation of an appropriate spill contingency plan. | | | | |

| MP 9.0 – Cultural Heritage | | | | | |
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| Issue/ Impact | Mitigation | | Monitoring | | Reporting |
| | Description | Schedule & Responsibility | Description | Schedule & Responsibility | |
| 9.1 General protection of cultural heritage | 9.1.1 The Operator shall fully comply with the Laws relating to the identification, protection, and preservation of items and sites of cultural and natural heritage, and use reasonable efforts for the early detection of sites and items of cultural and natural heritage sites and natural monuments that may be of interest to Afghanistan, including conducting a preliminary visual survey of the locations of Hydrocarbon Operations prior to the commencement of operations on those locations. | Operator – prior to the commencement of operations and during operations | Regular inspection of operations site. | MERC to undertake periodic inspections during operations. | Monthly environmental reporting by Operator, reviewed and approved by MERC. |
| 9.2 Notification | 9.2.1 Contractor shall notify Operator and any other authorities with lawful jurisdiction within forty-eight hours of the discovery of any of the following:<br>a) Evidence of human activity appearing to be older than two hundred years:<br>b) Rare or unusual geological, rock or mineral formations and structures;<br>c) Meteorites;<br>d) Extraordinary paleontological remains, fossils or fossil impressions, either vertebrate and invertebrate;<br>e) Human graves or human remains;<br>f) Any other objects or sites of potentially significant cultural, | Contractor – during operations | Regular inspection of operations site. | Operator to undertake periodic inspections during operations. | Reporting finds to the MERC and the Cultural Resource department of the Ministry of Youth and Culture. |

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| | historical, or natural heritage sites, natural monuments and other objects that represent significant scientific or cultural interest. | | | | |
| 9.3 Subsurface Discoveries | 9.3.1 If mineral deposits or geothermal resources that may have commercial value are encountered during conduct of Hydrocarbons Operations, the Contractor shall:<br>a) Promptly inform the Operator of such encounters;<br>b) Collect cutting samples and determine their depth below surface; and<br>c) Submit such samples to the Ministry; however, the Ministry shall not suspend Hydrocarbons Operations on account of any such discovery of deposits. | | | | |
| 9.4 Suspension of Surface Operations | 9.4.1 The Ministry may suspend the Operator's construction or excavation activities for a reasonable time period on locations directly impacting discoveries described in Items 9.2.1 & 9.3.1, until the Ministry receives the results of an expert evaluation of such discovery. | Ministry – during operations. | Expert evaluation. | Ministry of Youth and Culture - during operations | Ministry of Youth and Culture to report findings to Ministry. |
| | 9.4.2 Within twenty days of notification of a discovery, the Ministry shall perform an expert evaluation of the discovery and notify the Operator if the discovery requires any modifications to its planned Hydrocarbon Operations. Such modifications may include:<br>a) Relocating the surface facility to a location outside the discovery area;<br>b) Incorporating closer surveillance for additional discoveries during further surface operations development of the construction of pipelines, excavations or storage areas. | Ministry – during operations. | N/A | N/A | Ministry to report findings to Operator. |
| | 9.4.3 If requested to do so by the Operator, the Ministry shall obtain from competent sources and provide to the Operator an | Ministry – prior to | N/A | N/A | Ministry to report findings to the |

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| | inventory of all known locations of items specified in Items 9.2.1 & 9.3.1 prior to the commencement of surface operations. | commencement of operations. | | | Operator. |

| MP 10.0 – Mines and UXO | | | | | |
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| Issue/ Impact | Mitigation | | Monitoring | | Reporting |
| | Description | Schedule & Responsibility | Description | Schedule & Responsibility | |
| 10.1 General UXO and Mine Issues | 10.1.1 The Contractor shall notify the Operator and the provincial military and police immediately if mines or unexploded ordnance (UXO) is located, immediately cease operations in the area, evacuate all personnel at least two kilometers from the location of the mine or unexploded ordnance, and take all possible steps to keep any person or vehicle from entering the evacuated area other than persons qualified to deal with the object(s). | Contractor – during operations | N/A | NA | Immediate reporting by Operator to MERC. |

| MP 11.0 – Health and Safety | | | | | |
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| Impact | Mitigation | | Monitoring | | Reporting |
| | Description | Schedule & Responsibility | Description | Schedule & Responsibility | |
| 11.1 Safety and Health Plan | 11.1.1 Prior to commencing Hydrocarbon Operations, Contractor shall submit a Safety and Health Plan to the Ministry for review by the Operator. | Contractor – prior to the commencement of operations. | Review and approval of plan. | MERC to review and approve plan prior to commencement of operations. | Contractor to prepare plan. |
| | 11.1.2 The Safety and Health Plan shall include a safety training and incident response plan which shall include:<br>a) A description of safety plans, measures and procedures that will be performed by Contractor or required of third-party subcontractors during the conduct of Hydrocarbons Operations;<br>b) A description of training programs, frequency of training and safety manuals that will be provided by Contractor to its personnel or required to be provided by third-party subcontractors during the conduct of Hydrocarbons Operations;<br>c) A list of names, company positions or job responsibilities, addresses, phone and facsimile numbers and electronic mail addresses, if applicable, of the persons responsible for all safety issues including safety training;<br>d) A list of names, company positions or job | | | | |

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| | responsibilities, addresses, phone and facsimile numbers and electronic mail addresses, if applicable, of the persons responsible for accident response;<br><br>A description of accident response facilities to be used and supervisory staff responsible for investigations that will be performed by Contractor or required of third party subcontractors in the event of a Major Health and Safety Incident during the conduct of Hydrocarbons Operations. Any Major Health and Safety Incident shall be reported to the Operator. | | | | |
| | 11.1.3 The Safety and Health Plan shall include Hazardous substances and conditions plans which shall include:<br><br>a) A description of general emergency response measures that will be organized or performed by Contractor or required of third-party subcontractors in the event of a spill or escape of Hazardous Substances during the conduct of Hydrocarbons Operations; and<br>b) A general description of emergency response measures that will be organized or performed by Contractor or required of third-party subcontractors in the event of a fire, explosion or other hazardous condition during the conduct of Hydrocarbons Operations. | | | | |
| | 11.1.4 The Safety and Health Plan shall include workplace safety and conditions plans which shall include:<br><br>a) A general description of all medical and first aid equipment to be maintained at each facility;<br>b) A general description of all safety equipment and documents to be maintained at each facility; and | | | | |

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| | c) A general description of all personal protection devices to be maintained at each facility. | | | | |
| | 11.1.5 In those fields and facilities where, in the Operator's opinion, the presence of $H_2S$ is possible, the Safety and Health Plan shall include a hydrogen sulfide safety plan that shall contain, without limitation, safety procedures, training programs, emergency drill procedures and a recommended inventory and description of all prevention and protection equipment. In addition, the hydrogen sulfide safety plan shall identify the job positions responsible for implementation of plan procedures and the specific duties, responsibilities and operating procedures that shall be implemented when a concentration of hydrogen sulfide is detected in the atmosphere that exceeds the Hazardous Limit of $H_2S$. | | | | |
| 11.2 Other Hydrogen Sulfide Issues | 11.2.1 The Operator shall take all necessary precautions and measures to protect workers, the general public and the environment against exposure to concentrations of hydrogen sulfide in excess of the Threshold Limit of $H_2S$ including the prominent placing of warning signs at distances that might be exposed to concentrations in excess of Hazardous Limit of $H_2S$ in the event of a release of hydrogen sulfide. | Operator – during the operations | Regular inspection of operations site. | MERC to undertake periodic inspections during operations. | Monthly environmental reporting by the Operator, reviewed and approved by the MERC. |
| | 11.2.2 The Contractor shall promptly notify the Operator in the event of a release of hydrogen sulfide to the atmosphere that exceeds Hazardous Limit of $H_2S$. | | | | |
| | 11.2.3 The Contractor shall ensure that all blowout preventers, well heads and other equipment and materials are corrosion resistant. | | | | |

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| | 11.2.4 The Contractor shall install, operate and maintain a hydrogen sulfide monitoring and detection system that initiates both audible and visual alarms throughout the affected area when the concentration of hydrogen sulfide in the atmosphere exceeds the Threshold Limit of $H_2S$. | | | | |
| | 11.2.5 Venting of gas containing $H_2S$ is not allowed except for life threatening situations or minor releases during maintenance, malfunctions or disruptions and repair activities that do not result in the atmospheric concentration of $H_2S$ of 20 parts per million or higher within 20 meters of the point of release. | | | | |
| | 11.2.6 Operator must prepare and submit to the Ministry, not later than fifteen days after the end of each calendar quarter, reports detailing gas flaring or venting and liquid hydrocarbon burning for each facility. The records must include for the preceding calendar quarter, at a minimum:<br>a) Estimated daily volumes of gas flared or vented and liquid hydrocarbons burned;<br>b) Estimates of the number of hours per day of flaring, venting, or burning of liquid hydrocarbons;<br>c) Reasons for flaring, venting, or burning; and<br>d) Estimated volumes of flared and vented gas containing $H_2S$ and the concentration of $H_2S$ in the gas flared. | Operator – during operations. | Review of Operators records. | MERC to review records monthly. | Monthly reporting as part of Operator's Monthly Environmental Report. |
| | 11.2.7 The MERC may, for safety or air pollution purposes, restrict the flaring of gas containing $H_2S$. | MERC – during operations. | Monitoring of gas flaring. | MERC to monitor Operator's flaring activities through the operational period. | None |

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| 11.3 Facility Requirements | 11.3.1 All facilities used in Hydrocarbon Operations shall be designed, fabricated, installed and maintained to ensure their structural integrity and to protect the safety and health of workers and the general public. | Contractor – prior to the commencement of operations and during the operations | Review of well site design with respect to safety and health issues.<br><br>Regular inspection of operations site. | Operator to review and approve well site designs and plans.<br><br>Operator to undertake periodic inspections during operations. | Monthly environmental reporting by the Operator, reviewed and approved by the MERC. |
| | 11.3.2 Work areas shall be designed, fabricated, installed and maintained to ensure the safety and health of the workers. Contractor shall provide its personnel with reasonable protection, as required by International Oilfield Practice and the Laws, against:<br>a) Extreme weather conditions;<br>b) Damaging noise and dangerous heat levels;<br>c) Dangerous exposure to flammable or explosive levels of gas or other hazardous vapors; and<br>d) Fire and explosion according to International Oilfield Practice as specified in the Health and Safety Plan. | | | | |
| | 11.3.3 Hazardous or dangerous areas shall be clearly marked in the primary language or languages used by Contractor's personnel or other persons likely to be in the areas on a regular basis and with generally recognized warning symbols. | | | | |
| | 11.3.4 Machinery, tools, pipes, tanks and other related equipment shall be fit for the purpose for which it is intended. Where practical, open, moving or revolving parts shall be fenced, jacketed, provided with mechanical guards, or screened as appropriate. | | | | |
| | 11.3.5 All electrical equipment shall be fit for the purpose for which it is intended. Maintenance of electrical equipment shall be performed at regular intervals according to the | | | | |

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| | manufacturer's recommendations or the Contractor's experience in order to minimize the risk of fire or explosion. | | | | |
| 11.4 Sanitary waste systems | 11.4.1 The Contractor shall construct and maintain sanitary facilities at each location used by it during the term of Hydrocarbon Operations for accommodation of personnel, ablution, and food preparation and dining. The disposal system shall consist of:<br>a) Pipes impervious to water, installed and maintained to prevent leakage, connected to a suitably constructed septic tank;<br>b) A soak pit system adequate to process the waste anticipated during all reasonably anticipated weather conditions. | Contractor – prior to the commencement of operations and during the operations | Review of well site design with respect to safety and health issues.<br><br>Regular inspection of operations site. | Operator to review and approve well site designs and plans.<br>Operator to undertake periodic inspections during operations. | Monthly environmental reporting by the Operator reviewed and approved by MERC. |
| | 11.4.2 Contractor shall regularly inspect and maintain the sanitary facilities, including emptying of the septic tank by qualified personnel and suitable equipment, as needed. | | | | |
| | 11.4.3 Contractor shall, at a minimum, place portable chemical toilets at drill-sites and other work locations, or may construct and maintain a septic system at work locations. The portable toilets shall be properly maintained and serviced. | | | | |
| | 11.4.4 If authorized by the Operator, a dry or composting sanitary system. Latrines, slit trench, or pits shall not be permitted. | | | | |
| | 11.4.5 All septic tanks and soak pits shall be placed, constructed, and maintained so as to prevent any contamination of Fresh Water sources, whether or not currently used as a Fresh Water source for any purpose. | | | | |

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| 11.5 PPE | 11.5.1 The Contractor shall provide personal protection equipment to protect all workers, authorized Operator personnel, and authorized visitors against likely risks to safety and health.<br><br>11.5.2 In compliance with International Oilfield Practices and where work conditions require, the minimum set of personal protection equipment for workers shall include:<br>a) Hard hat;<br>b) Protective footwear with steel toe-caps;<br>c) Spark or flame retardant overalls or other work clothing, as appropriate;<br>d) Gloves;<br>e) Eye protection;<br>f) Hearing protectors;<br>g) Where appropriate, breathing apparatus positioned to be readily available to all personnel in the event of a release of toxic or corrosive gases or liquids.<br>h) Authorized Operator personnel shall be provided with, at a minimum, hard hats, personal detectors for toxic releases, and access to breathing apparatus.<br><br>11.5.3 All personal protection equipment shall be inspected periodically and maintained in good, usable condition and, if not regularly used, it shall be located in a readily accessible area | Contractor – during operations | Regular inspection of PPE on site. | Operator to undertake periodic inspections during operations. | Monthly environmental reporting by the Operator, reviewed and approved by the MERC. |
| 11.6 Monitoring Systems and | 11.6.1 Monitoring systems and alarms shall be installed, located, maintained and operated in fields, facilities and support | Contractor – | Operator - | Contractor to | Monthly |

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| Alarms | operations in accordance with International Oilfield Practice by Contractor. | prior to the commencement of operations and during the operations | inspection and testing of monitoring system and alarms.<br><br>Regular inspection of operations site by Contractor. | inspect and test systems prior to commencement of operations under supervision of Operator.<br><br>Operator to undertake periodic inspections during operations. | environmental reporting by Operator, reviewed and approved by the MERC. |
| | 11.6.2 Where work conditions require, the Contractor shall install, maintain and operate an automatic monitoring system capable of detecting and responding to the presence of fire, flame, heat or smoke by initiating the appropriate alarms and responses. | | | | |
| | 11.6.3 The Contractor shall install, maintain and operate an automatic monitoring system capable of detecting and responding to the presence of toxic or flammable gas or vapor by initiating the appropriate alarms and responses. | | | | |
| | 11.6.4 The Contractor shall install, maintain and operate backup monitoring systems capable of alerting workers in the event a primary monitoring system fails or shuts down. | | | | |
| | 11.6.5 The Contractor shall ensure that all critical monitoring systems remain operational in the event of a primary power failure, whether primary power is provided by mains service or by Contractor. | | | | |

# 4 Implementation of the EMP

## 4.1 General

The primarily responsible party for the operations covered by the EMP is the Ministry of Mines, which is the operator of the Juma/Bashikurd Field. In this EMP, the Ministry is designated as the "Operator." Physical operations will be conducted by a commercial gas field services contractor ("Contractor") which will answer directly to the Ministry.

The overall operations will be managed by a committee of senior Ministry staff, the Monitoring, Evaluation, and Reporting Committee ("MERC") appointed by the Minister of Mines. The MERC will be supported by a contract manager and by Ministry representatives who will be present at the operations locations to monitor Contractor operations and compliance. Under the EMP the MERC has express responsibilities for oversight of EMP compliance.

At this time the Ministry plans to employ an experienced petroleum engineering firm to provide support to the Ministry's on-location representatives and to the MERC. One of the requirements for this firm will be knowledge and experience in HSE issues involved in drilling and re-entry operations. In particular, experience in dealing with operations in which hydrogen sulfide and carbon dioxide exposure is a risk.

The Operator shall be responsible for the implementation of the EMP with oversight from the MERC. The Operator shall ensure that there is, on-site at all times, a member of Contractor's staff trained in Health, Safety and Environment (HSE) and able to implement all aspects this EMP. The Operator shall ensure that the Contractor's staff includes one HSE Manager and one Deputy HSE Manager, thereby ensuring at least one HSE representative on-site at all times of operations. The HSE staff need not be full-time HSE experts, but they shall have past experience of HSE issues on similar projects. They shall also be trained in all aspects of this EMP prior to the start of project operations – the details of which are provided below.

The EMP has been designed to place primary responsibility for each requirement with the party best able to assure compliance. (For example, placing direct compliance responsibility for most worker safety requirements with the Contractor. Regular inspection and review is provided for as well.

## 4.2 Permits and Reporting

### 4.2.1 Environmental Permits and Reporting Requirements

The Operator shall be responsible for obtaining licenses and permits for the extraction of groundwater and surface water. Permits shall be submitted to the MERC for review prior to the commencement of groundwater and surface water extractions.

The Operator shall be responsible for the Contractor's preparing a number of environmental plans prior to the commencement of operations, subject to the approval of the Operator they include:

- Waste Management Plan;
- Safety and Health Plan; and
- Spill Response Plan.

The Operator shall be also responsible for the preparation of a monthly environmental report. The purpose of the report is to provide the MERC a monthly summary of site related environmental issues. The report,

prepared by the Operators HSE staff, shall include a checklist of all the items in this EMP and a description of the Operator's and Contractor's compliance with the EMP checklist items. The report shall also describe any issues such as significant spills, requirements for drilling of groundwater wells, test results – such as toxicity levels of drilling mud and any other pertinent environmental issues.

Finally, at the completion of operations, the Operator shall supply the MERC with a final environmental close out report. The report will include all details of the Contractor's and Operator's well site restoration and all items listed in Section 1.4 of the EMP.

### 4.2.2 Health and Safety Reporting Requirements

In addition to the Monthly Environmental Report, the Operator shall prepare and maintain full and complete records of all relevant activities related to the safety and health of workers and the general public, including incidents of serious personal injury, fire or explosion, spillage or escape of hazardous substances, or the unsafe operation of equipment and shall deliver to the Ministry all such information and reports not less than delivery days after the occurrence of any incident described in MP.11.

## 4.3 Training

### 4.3.1 Environmental Training Requirements

Each Con tractor shall develop and implement an environmental training program, or implement its existing environmental training program to train appropriate Contractor subcontractor, and designated Operator personnel in the following:

- The Contractor's environmental policy, objectives and procedures;
- Technical environmental training in the management of air quality, water quality, waste, hazardous material handling;
- Training relative to this EMP;
- Training relative to the Contractor's Spill Response Plan;
- Training relative to the principles of quality control and quality assurance as it applies to investigations, monitoring, sample collection, transportation and analysis. Such training activities may be done by outside sources at the choice of the Operator;
- Any other relevant requirement reasonably requested by the Operator or MERC relating to environmental training.

### 4.3.2 Health and Safety Training Requirements

Contractor shall ensure that all workers receive continuing safety training, instructions on safety issues and education, and verify through testing such knowledge in compliance with the Safety and Health Plan that is sufficient in scope to enable the worker to perform their required functions in a safe and workmanlike manner. In addition, the Contractor shall develop, implement and practice at regular intervals emergency drills in compliance with the approved Safety and Health Plan that are sufficient in scope to provide training for all likely occurrences. Such drills shall include, without limitation, emergency procedures related to well control, fire, explosion, emergency evacuation, medical emergencies and the unexpected release of Hazardous Substances. The execution of such drills shall be documented in the Contractor's records.

## Appendix A – Standards and Guidelines

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| Surface Clearance, Preparation & Construction | **Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development** - The Gold Book<br>Fourth Edition—Revised 2007. United States Department of the Interior, Bureau of Land Management, United States Department of Agriculture |
| | **Oil and Gas Well Drilling Service Tool** - Occupational Health and safety Administration - United States Department of Labor (http://www.osha.gov/SLTC/etools/oilandgas/index.html) |
| Well-site Reclamation Process | **Upstream Oil and Gas Reclamation Criteria** - Alberta Environment and Sustainable Resource Development (http://environment.alberta.ca/01884.html) |
| | **Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development** - The Gold Book<br>Fourth Edition—Revised 2007. United States Department of the Interior, Bureau of Land Management, United States Department of Agriculture |
| Abandoned Wells | **Directive 020, Well Abandonment** (2010) - Energy Resources Conservation Board, Alberta, Canada |
| | **Plugging and Abandonment of Oil and Gas Wells**, Paper #2-25, The National Petroleum Council (NPC) (2011) |
| | **Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development** - The Gold Book<br>Fourth Edition—Revised 2007. United States Department of the Interior, Bureau of Land Management, United States Department of Agriculture |
| Blow Outs | **Well Drilling Guideline** (2012) – British Columbia Oil and Gas Commission. |

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| | Oil and Gas Well Drilling Service Tool - Occupational Health and safety Administration - United States Department of Labor (http://www.osha.gov/SLTC/etools/oilandgas/index.html) |
| Tubing and Well Head Equipment | Well Construction Standards, Health and Safety Executive, UK (http://www.hse.gov.uk/foi/internalops/ hid_circs/technical_general/spc_tech_gen_42.htm) |
| | Oil and Gas Well Drilling Service Tool - Occupational Health and safety Administration - United States Department of Labor (http://www.osha.gov/SLTC/etools/oilandgas/index.html) |
| Air Quality | Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants - 40 CFR Part 63 - USEPA. |
| | Air Quality Standard Permit for Oil and Gas Handling and Production Facilities – Texas Commission for Environmental Quality |
| | Draft National Ambient Air Quality Standard for Afghanistan (2009) - NEPA |
| Produced Water | Guidelines for Produced Water Injection (2000) – International Association of Oil and Gas Producers |
| | Management of Produced Water from Oil and Gas Wells Paper #2-25, The National Petroleum Council (NPC) (2011) |
| | Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development - The Gold Book Fourth Edition—Revised 2007. United States Department of the Interior, Bureau of Land Management, United States Department of Agriculture |
| Drilling Fluid Pits and Contents | Management of Oil and Gas Exploration and Production Pits - United States Department of the Interior BUREAU OF LAND MANAGEMENT (2011) |
| | RULE B – 17 Well Drilling Pits and Completion Pit Requirements – Arkansas Secretary of State |

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| | Drilling Fluid Management – Department of Mines and Petroleum, Western Australia |
| | Drilling fluids and health risk management: A guide for drilling personnel, managers and health professionals in the oil and gas industry - International Petroleum Industry Environmental Conservation Association |