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Antalya / TURKIYE

## **SITE ASSESSMENT REPORT (SAR)**

### **Underground Storage Tank (UST-EAST)**

**Camp Arena, Herat International Airport**

**HERAT, AFGHANISTAN**

**DATE: 22 JULY 2019**

<b>Rev</b>	<b>Date</b>	<b>Description</b>	<b>Prepared by</b>	<b>Reviewed by</b>	<b>Reviewed by</b>
0	22JUL2019	First release.	[BIYOREM] Hakan UZ Environ. Consultant	[FEKA] Mehdi KERTUSHA QC Manager	[FEKA] Emre DALGIC Project manager

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1. INTRODUCTION

Three (3) separate power stations are located in the east, west and south portions of Camp Arena. These power stations contain diesel-electrical generators that supply electricity to various facilities at Camp Arena. The fuel supplies for each of these power stations were previously stored in steel tanks and contained within concrete enclosures located below surface. These tanks have recently been decommissioned and the fuel supply for each power station now originates from steel tanks that are located above ground. The new tanks are isolated from the old USTs.

The USTs were inspected during their decommissioning process. The inspection determined that there was a strong likelihood that each tank had leaked a significant amount of diesel fuel. For this reason, the USTs have been left in their existing positions so that an expert Contractor could manage their removal.

NSPA requires design and build services for soil remediation work at three (3) UST sites and a BFI at Camp Arena, Afghanistan. This report describes the extent of activities that shall be performed as part of these services



Illustration 1: Nameplate of UST-EAST

## 2. BASIC INFORMATION ABOUT THE INVESTIGATED SITE



**Illustration 2: Herat International Airport and the military Camp Arena**

Herat is the third largest city in Afghanistan with a population of about 400,000. It is the capital of Herat Province, located in the west of Afghanistan at an altitude of 1,000 m above sea level. Hari River of Hari Rud runs the along the south of the city from the west to the east. Along the river, intensive agriculture is existent, food grains and fruits near the river and animal breeding at the outskirts of the areas irrigated. Herat International Airport (referred to by IFAF/NATO as Camp ARENA) is located about 20 kilometers of Herat City. It serves as one of Afghanistan's international airports and as military base especially for the allied air force.

The airport runway runs in a south-north direction and along its western part the military camp of the NATO lead ISAF forces is situated. The main parts of the fuel facility investigated are located at the southern part of the camp (southwestern side of the runway). To the north of the military camp the area is used for agriculture with small villages or single small farmhouses. To the west of the camp an industrial/commercial area is developing. To the southwest over south to the east north area is used for some agricultural activities and for animal breeding.



**Illustration 3: Aerial photo of Herat and southern urban hinterland with the airport**

### 3. REFERENCES

- BS 10175:2011 : Investigation of potentially contaminated soil
- Correspondence: FEKA-AFG-HRT-CRS-007 rev0, RFA for Remediation media [Biyorem]
- Correspondence no: FEKA-AFG-HRT-CRS-006 rev0, RFA for In-situ analyzer system for TPH in soil [Petroflag]
- Correspondance no: FEKA-AFG-HRT-CRS-013 rev0, Nuclear density gauge for compaction test [Xplorer 3500]

### 4. ABBREVIATIONS

- NSPA Nato Support and Procurement Agency

- CTR Contractor (Feka Construction Inc.)
- Base Camp Arena, Herat, Afghanistan
- TO NSPA's technical officer
- A/G Above ground
- U/G Under ground
- POC Point of Contact
- Work Excavation and remediation of contaminated soil, and backfilling with suitable material in BFI
- Remediation yard A designated area which is located off-base to store and remediate contaminated soil
- TPH Total Petroleum Hydrocarbon
- UST Underground Storage Tank

## 5. EQUIPMENT, TOOLS, MATERIALS, MANPOWER

### a) Equipment

- Crane to remove and install back concrete panels
- Excavator to excavate contaminated soil and backfill new material
- JCB will be loading dump trucks in temporary stockpile in Esko-Gate
- Drum roller to compact backfill material
- Dump truck to transport contaminated soil to temporary stockpile and to remediation yard
- TPH device an in-situ testing device to measure the TPH in the soil and report accordingly
- Nuclear density gauge to test compaction ratio of backfilling layers
- Drager X-am 2500 to monitor gas contamination in excavation environmental

### b) Tools

- Total station to measure the volume of excavation and backfilling works.

### c) Materials

- Remediation media
- Barriers, sand bags to be used in site enclosure
- Safety harness & robe emergency evacuation in excavation area

d) Manpower

In addition to CTR’s technical staff and required equipment operators, following personnel will be assigned to Work:

- Foreman Will take instruction from CTR’s construction manager and supervise the Work accordingly.
- Safety officer Will be presented at job-site at all times and supervise the safety measures of Work. Safety officer will also coordinate the Work with required parties (e.g. Engineer’s safety officer, Fire station of Base, etc.)
- Construction team Will be consisted of following personnel
  - 1 technician- to perform compaction test with nuclear density gauge
  - 2 unskilled labors- to install site closure, to flag dump truck maneuvers, and to help similar construction works.
- Surveyor To measure the volume of excavation and backfilling works.

6. PRELIMINARY WORKS

Following issues shall be finalized and agreed with Engineer prior to commencement of Work:

- Obtain dig permit from or as directed by Engineer
- Complete the site closure
- Inform Fire Station
- Finalize all documentation and get Engineer’s approval (e.g. method statement, QC plan, HSE plan)
- Crane. All documentation of crane shall be submitted to Engineer in advance for review (e.g. technical specification and certificates of crane, crane operator certificate)

7. CONSTRUCTION

7.a. In-situ TPH testing

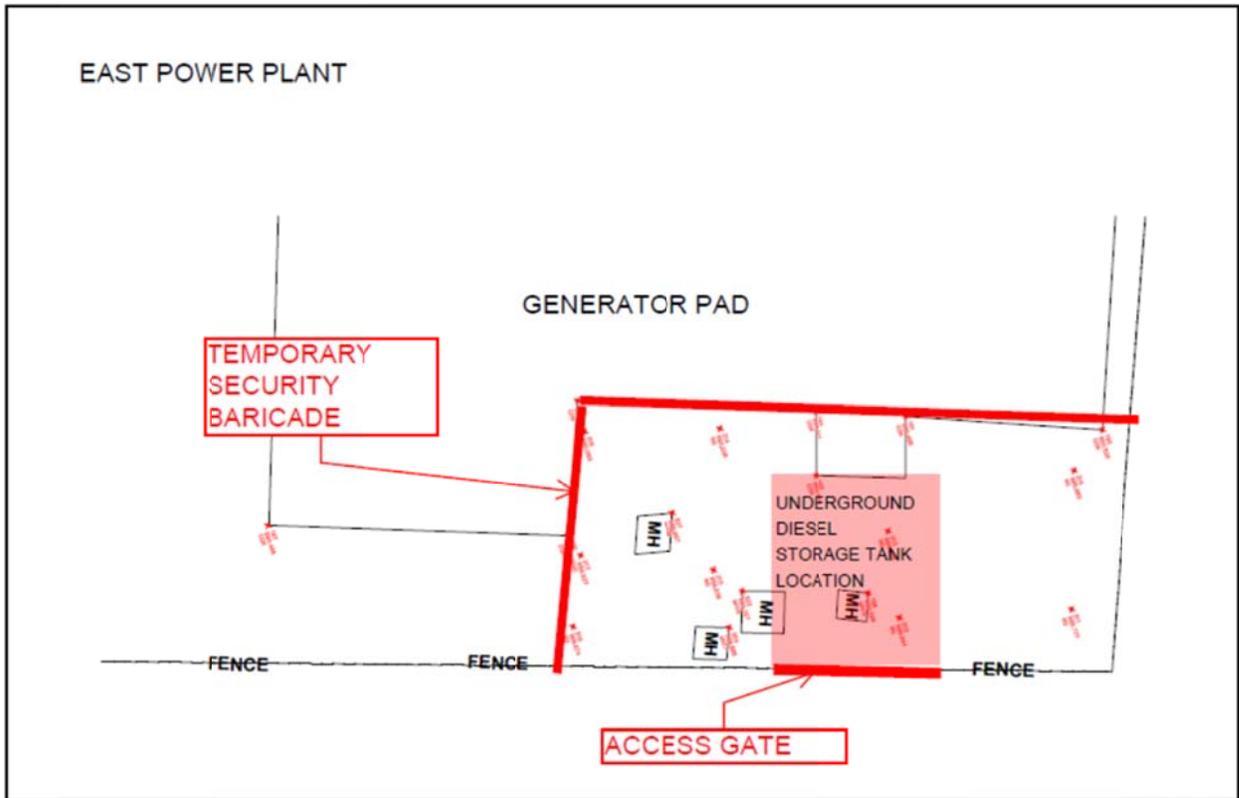
<p>TPH content of soil will be measured in-situ with <b>PetroFLAG® Analyzer System for TPH in Soil</b> (EPA SW-486, Method 9074).</p>	
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PetroFLAG® system provides on-site TPH analysis and contains NO hazardous chlorofluorocarbons, chlorinated solvents, or dyes. The test method responds to the broadest range of hydrocarbons possible offering consistent extraction efficiencies over the range of soil types and conditions most commonly encountered in the field. PetroFLAG quantifies both aliphatic and aromatic hydrocarbons in a range from C8-C44; from fuels to heavy lubes/greases. Results reflect total the hydrocarbon concentration in the sample.

There are 15 programmed response factors to choose from covering a range from weathered gasoline to crude oil Using the standard 10 gm soil sample, the range is \*15 ppm (MDL) to 2000 ppm. Higher results up to 200,000 ppm (2%) are possible using a smaller sample size with a multiplier, and/or by using the High Range Extraction option.

**7.b. Excavation and backfilling in UST-East**

The excavation and backfilling procedure in UST-East started on 12th of June 2019. Firstly, the site is closed as per below sketch:





**Illustration 4: UST-East site closure**

Concrete demolishment and installation removal started.



**Illustration 5: UST-East concrete demolishment work and installation removal**



**Illustration 6: UST-East concrete demolition work and installation removal**

After finishing the site preparation phase, flange pit is demolished.



**Illustration 7: Demolishment of flange pit**



**Illustration 8: Inlet flange**

Bore drilling investigation took place in UST-East, where it was found out that the tank base is 1m below the foundation of the structure.



**Illustration 9: UST-East bore drilling investigation**



**Illustration 10: UST-East bore drilling investigation**

Two samples were taken from -3.80m and -4.20m from tank base level. Using sensoric inspection (smell), both samples were significantly contaminated. As a consequence, bore drilling investigation continued.



**Illustration 11: UST-East -3.80m and -4.20m below tank base level samples**



**Illustration 12: UST-East bore drilling investigation**



**Illustration 13: Completion of UST-East bore drilling investigation**

THP test is made for the sample taken -10.8 m from base tank level, showing a 1764 ppm for 2 gram test sample as shown below, totally a contamination of 8820 ppm with a DF=5. This THP test result, which is not acceptable, stopped the further work of the site. Since the continuation of work at UST-East was considered significantly risky, it was decided to stop at this phase.



**Illustration 14: THP test for sample at -10.8m below tank base level**

## 8. SAFETY

Safety officer will be acting in a PIC role and be present at all times. Work will cease if he must leave site.

Risk assessments (RA) for following items has been studied and attached (refer to Attachment).

- Mobile cranes
- Lifting operations
- Excavations
- Loading-unloading dump trucks
- Backfilling & compaction
- Taking samples in excavation area

Following safety measures will be taken at job site, prior to commencement of Work:

- The excavation site is not expected to be considered as *Confined Space* as identified in *Confined Spaces British Regulations 1997*. However, due to the importance of BFI fuel facility which is also under operation, we may consult to said regulation for additional safety measures.

 <p>FEKA Construction</p>	<p>ENVIRONMENTAL SITE ASSESSMENT and REMEDATION ACTION PLAN FOR UST-SOUTH</p>	 <p>BIYOREM Engineering</p>
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- To prevent collapsing of soil, sides of excavation will be sloped. When depth of excavation exceeds 4 meters, a step will be provided as an additional precaution.
- In addition to mobile cranes, a dedicated banksman will be assigned to supervise and coordinate all equipment traffic within BFI compound.
- No power tool is allowed to use within BFI compound unless explosion proof housing is provided.
- All fuel driven equipment shall be using diesel as a fuel, no benzene driven equipment is allowed within BFI compound.
- Fire station will be informed before and during excavation. In case of a collapse, the excavation team will immediately be taken out from excavation area.

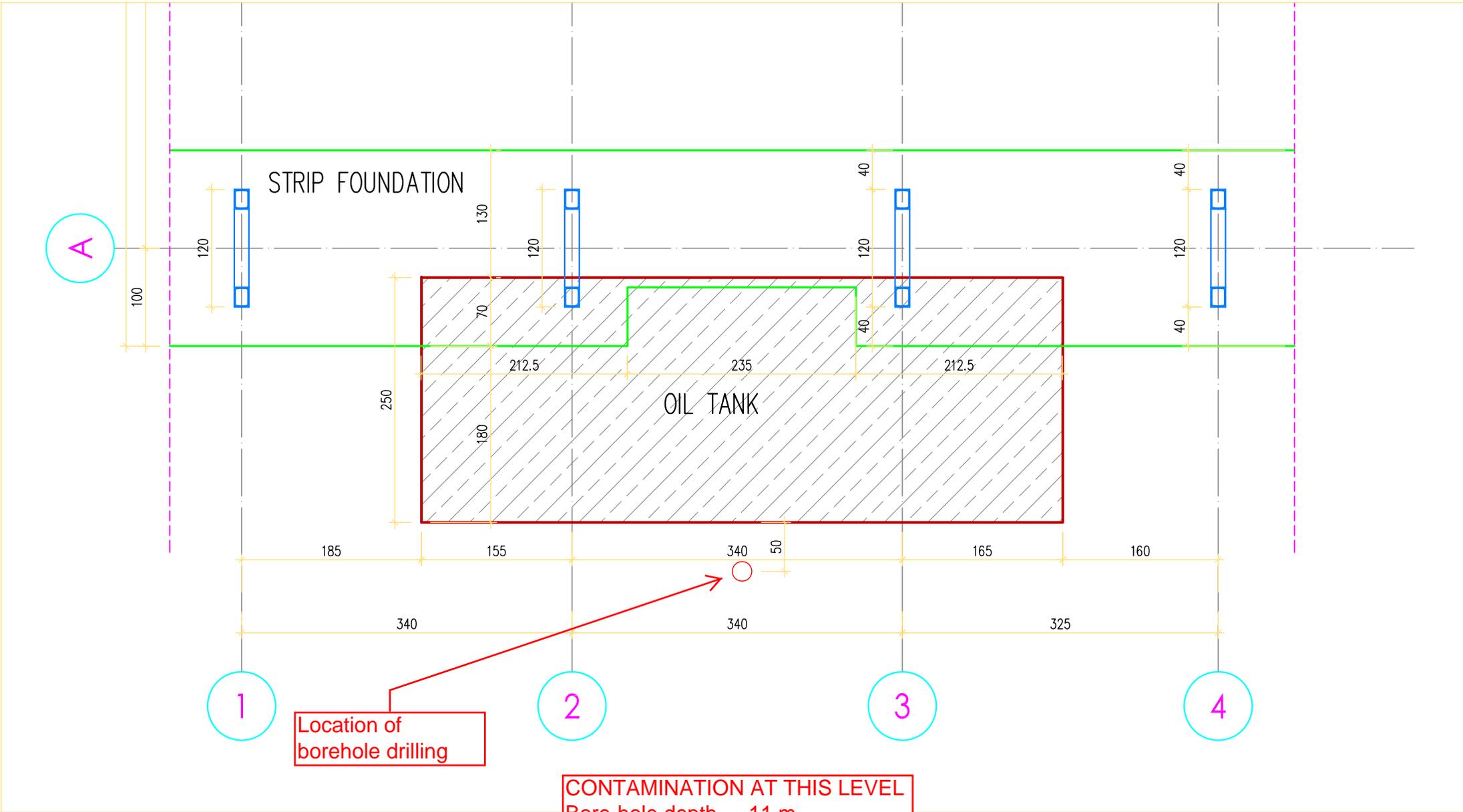
#### CONFINED SPACE PLAN

- Soil type in BFI is **Type-B** when classified as per OSHA, 1926, Subpart P, Excavations.
- Excavation, sloping and benching will be done as per OSHA 1926 to minimize collapse.
- After completion of excavation the substrate will be let to self-ventilate for 24hrs. This will suffice the concern regarding CO<sub>2</sub> or CH<sub>4</sub> inhalation since the contamination of such gases measured below the compliance limit (refer to Site Assessment Report, Intergeo, Austria, 2016, reference number: 11970-3c).
- The contaminant gas levels will be continuously monitored with Drager X-am 2500 gas detector. Any personnel needs to work in excavation substrate, has to be equipped with personnel gas detector.
- In addition to gas detector monitoring, all personnel working excavation area will be equipped with safety harness and tied with robe for emergency evacuation purposes.
- Access to bottom of excavation will be achieved by use of steel ladder equipped with 1-side steel guardrail.

#### 10. ATTACHMENTS

10.1. Engineering drawing

10.2. Petroflag TPH test report



Location of borehole drilling

CONTAMINATION AT THIS LEVEL  
 Bore-hole depth = -11 m  
 TPH reading = 8820 ppm



## Hydrocarbon Test Kit - Field Data Sheet

Date: 17.07.2019

Calibration Time/Date: 16:05/15.07.2019

Operator: FEKA CONSTRUCTION

Calibration Temperature: 27.5

Location: UST-EAST(-11m)

No.	Sample ID	Weight	Time/Date	Reading (ppm)	DF <sup>1</sup>	RF <sup>2</sup>	Actual (ppm)	Comments
1	1	2	17.07.2019	1764	5	5	8820	NOT PASSED
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

<sup>1</sup>DF = Dilution Factor, e.g., for 5 gram soil sample DF=10g/5g=2, and actual concentration equals reading times DF (reading (ppm) x DF = actual concentration).

<sup>2</sup>RF = Response Factor, selected for the hydrocarbon contamination at the site.