Uch-II Power (Private) Limited

# EIA for Extension of 404 MW Power Generation Capacity at Uch Power Station

Volume-1: Addendum to EIA

September 2010

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# Acronyms

| | |
|---|---|
| ADB | Asian Development Bank |
| BEPA | Balochistan Environmental Protection Agency |
| BTU | British thermal unit |
| CSTR | Continuous Stirred Tank Reactor |
| CO | Carbon monoxide |
| DAF | Dissolved Air Flotation |
| DO | Dissolved Oxygen |
| EA | Environmental Assessment |
| GHG | Green House Gases |
| HPK | Halcrow Pakistan (Pvt) Ltd |
| HSD | High Speed Diesel |
| IFC | International Finance Corporation |
| IUCN | International Union for Conservation of Nature |
| MW | Mega Watt |
| NAAQS | National Ambient Air Quality Standards |
| NEQS | National Environmental Quality Standards |
| NOx | Nitrogen dioxide and Nitric oxide |
| O&M | Operation and Maintenance |
| PI | Proportional-Integral |
| $PM_{10}$ | Particulate matter less than 10 micron |
| $SO_2$ | Sulfur dioxide |
| SRT | Solids Retention Time |
| Uch-I | Existing power plant |
| Uch-II | Proposed power plant |
| UPL | Uch Power (Private) Limited |
| UPS | Uch Power Station |
| USEPA | United States Environmental Protection Agency |
| WHO | World Health Organization |

# 1 Introduction

## *1.1 The Addendum*

This report serves as an addendum to the Environmental Impact Assessment (EIA) study carried out by Halcrow Pakistan (Pvt) Ltd (HPK) for the expansion of power generation capacity by 404 Mega Watt (MW) at the existing Uch Power Station (UPS) located near Dera Murad Jamali in Naseerabad district of Balochistan province. The EIA study has already been completed and submitted to UPL for approval from Balochistan Environmental Protection Agency (BEPA).

The addendum has been prepared to incorporate Asian Development Bank (ADB) comments raised during the review process of the EIA study for the said project. Each of the comments is addressed in the following sections.

## *1.2 Proposed Site Description*

The site for the Uch-II expansion project lies adjacent to the existing power station in an already brick walled area not accessible to local population. It will cover an area of about 63 hectares (156 acres) including space for evaporation pond, raw water pond and residential and recreational facilities in the plant colony. The site is more or less a levelled area consisting of sparse vegetation which is xerophytic in nature and of low economic value. No endangered floral species are present at the site. The soils of the site are mainly fine silty approaching to clayey. Most of Uch-II site has never been partly cleared and levelled in past except for the small areas involving construction of old security building, old HPE yard, and DRA tower. Old security building has already been demolished whereas HPE yard and DRA tower will be demolished and relocated respectively.

## *1.3 Construction Schedule*

Uch-II plans to start the construction activity for the proposed power station by first quarter 2011, whereas, the Commercial Operation Date (CoD) is planned in the third quarter of 2013. Construction schedule is shown in **Table 1-1**.

## *1.4 Wastewater/Sewage during Construction*

The wastewater during the Uch-II construction phase will mainly consist of sanitary wastewater/sewage generated from construction camps. Nearly 120$m^3$[1] of daily sewage is expected to be generated. The source of sewage will include toilets, washrooms, laundry and kitchen. The sewage will be collected in closed drains and will be treated in a

[1] This value is based on a per capita consumption of 40 gallons per day (as used by government departments such as public health engineering etc.) with a construction crew comprising of around 700 people

wastewater treatment system, using septic tanks. The treated wastewater will then be disposed off to evaporation pond.

## 1.5 *Wastewater Generation during Uch-II Operation*

Wastewater during Uch-II plant operations will consist of the following main streams:

- Cooling tower blow down;
- Demin plant regenerated wastewater;
- Sanitary wastewater;
- Oily wastewater; and
- Sludge from clarifiers

Detail of each of these wastes along with the treatment method is discussed as follows:

### 1.5.1 *Cooling Tower Blow down*

Cooling tower blow down will be sent to an on site industrial wastewater pond where it will be mixed with other treated waste water streams from sanitary wastewater treatment plant, neutralisation pit of demin plant and oil water separator. Wastewater from industrial waste water pond will be transferred to a clarifier where clarified water and sludge will be separated and transferred to their holding tanks respectively. The sludge generated from the holding tanks will be sent to the sanitary wastewater treatment system for further processing.

Clarified water will first be filtered through the sand filters and will then pass through Reverse Osmosis (RO) membranes. Filtered water from RO will be transferred to RO water tank from where it will be pumped to the CW system for reuse, whereas concentrate from RO will be discharged to the evaporation pond for final disposal. Further details of this wastewater system are provided in the proposed process flow diagram (**Drawing no. 8804-H8-PP-312-013**) provided by EPC.

### 1.5.2 *Demin Plant Regenerated Wastewater*

Regenerated water from demin plant will be treated in neutralisation pit as shown in **Drawing no. 8804-H6-PP-312-012**. Under this process, acidic wastewater is treated with alkaline solution, while alkaline wastewater is treated with acidic solution. In either case, the wastewater is treated until it is neutralised to a pH of 7 or any other desired pH. Wastewater after neutralisation will be discharged to the wastewater pond for further treatment and recycling through RO System as described above.

### 1.5.3 *Sanitary Wastewater*

Sanitary wastewater will normally consist of sewage generated from plant, colony and the administration building and is expected to be around $100m^3$ per day during plant operation. The proposed process flow of Sanitary Water treatment is shown in **Drawing no 8804-S5-PP-312-010**. As indicated, sanitary wastewater will first pass through the screen channel containing bar and mechanical screens for removal of any floating materials. After the screen channel, water will flow to an influent pumping tank where it will be mixed with the filtrate from the drying bed. The mixture will then be transferred to aeration tanks via two submersible pumps as part of activated sludge removal process.

The activated-sludge process is an aerobic, continuous-flow system containing a mass of activated micro-organisms that are capable of stabilising organic matter. The process consists of delivering clarified wastewater, after primary settling, into an aeration tank where it is mixed with an active mass of microorganisms, mainly bacteria and protozoa, which aerobically degrade organic matter into carbon dioxide, water, new cells, and other end products. The bacteria involved in activated sludge systems are primarily Gram-negative species, including carbon oxidizers, nitrogen oxidizers, floc formers and non-floc formers, and aerobes and facultative anaerobes. The protozoa, for their part, include flagellates, amoebas and ciliates. An aerobic environment will be maintained in the basin by means of two (1D+1S) mechanical blowers. After that, mixed liquor will pass into the secondary clarifier, where the sludge will be allowed to settle and clarified water will be transferred to the Chlorine contact tank.

The Chlorine content will be automatically monitored and controlled in this tank via dosing of Hypo Chlorite through two pumps (1D+1S). The final treated water from this tank will then be transferred to the industrial wastewater pond.

The sludge generated from the secondary clarifier will be transferred to a sludge tank where it will be mixed with the sludge generated from the RO system. The mixture will finally be taken to the sludge drying bed where it will be dewatered. The filtrate from the sludge beds will be routed back to the influent tank for re-use in the treatment process whereas the sludge will be disposed off in the on site land fill area.

### *1.5.4 Oily Wastewater*

Drains passing through different areas of the power plant susceptible to contain oil spillages will be treated in oily water separator before being transferred to the waste water pond. The oil water separator will be a gravity separation device designed by using Stokes Law to define the rise velocity of oil droplets based on their density and size. The design of the separator is based on the specific gravity difference between the oil and the wastewater because that difference is much smaller than the specific gravity difference between the suspended solids and water. Based on that design criterion, most of the suspended solids will settle to the bottom of the separator as a sediment layer, the oil will rise to top of the separator, and the wastewater will be the middle layer between the oil on top and the solids on the bottom.

The oil layer will be skimmed off and stored in a storage tank for onward disposal whereas the separated water will be sent to waste water pond via two pumps (1D+1S) for further treatment through RO system as described above.

The proposed process flow diagram of oil water separator is provided in **Drawing no. 8804-S12-PP-312-011**.

### *1.5.5 Sludge from Clarifiers*

Raw water clarifiers will be the main source of sludge generation. Drains from these clarifiers will deliver the sludge into the sludge thickener from where, the separated water will be transferred to filtrate tank and the sludge to its holding tank. Two pumps (1D+1S) will be used to transfer the sludge from this holding tank to the Plate Type Filter Press which will separate the remaining water from the sludge through thickening, dewatering and drying, Water from this process will be transferred to filtrate tank for reuse whereas the collected sludge will be disposed off in the on site land fill area.

## *1.6 Conservation Status of Floral Species*

No rare, endangered or threatened vegetation specie has been observed / recorded from the project area. Only one recorded specie namely *Cyperus rotundus* is however, listed in IUCN Red list. This list categories and criteria are intended to be an easily and widely understood system for classifying species at high risk of global extinction. *Cyperus rotundus* is listed in Least Concerned category of IUCN Red List. According to definition mentioned in the Red List, Least Concerned[2] means the specie has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

Furthermore, *Cyperus rotundus* is considered to be widely distributed through out the tropics and subtropics in 52 different crops and in 92 countries (Rao, 2000) and is very common throughout South East Asia (Merita & Moody, 1999; Rajput *et al.*, 2008). In Pakistan it is among the most common weeds found throughout the Indus valley during summer season in major field crops such as cotton, sugarcane and maize. Hence removal of this specie will not have any adverse affect on the conservation of this plant.

The list of floral species identified during the field survey of the EIA study along with their conservation status is shown in **Table 1-2**.

[2] http://www.iucnredlist.org/apps/redlist/static/categories_criteria_3_1#critical [accessed on September 06, 2010]

## 1.7 Particulate Matter Emissions and Ambient Air Quality

### 1.7.1 Ambient Air Quality

The ambient air quality in the project area may be regarded as degraded with respect to SOx, NOx and CO as their values in the ambient air is below the various national and international guideline values. Similarly, particulate matter less than 10 micron in size ($PM_{10}$) in ambient air is within the WHO interim guideline values that have been defined to achieve the guideline limit in a phase wise manner. In addition, $PM_{10}$ value also complies with limits in National Ambient Air Quality Standards (NAAQS) as prescribed by the United States Environmental Protection Agency (USEPA). However background $PM_{10}$ values are in access of World Health Organisation (WHO) ambient air quality guideline value for an averaging time period of 24hours (i.e. 50 $\mu g/m^3$).

Elevated levels of $PM_{10}$ as well as that of Particulate Matter (PM) from windborne dust are natural in the project area for most months of the year due to:

- The very arid conditions (annual rainfall less than 200mm) – around 10 months of the year receive minimal to no rainfall
- Minimal vegetation cover
- Hence soil is subject to wind erosion

To further illustrate this point, ambient air quality was again carried out in September 2010 to measure $PM_{10}$ ground level concentration values with in the existing power station as well as out side of the power station. Spot sampling was carried out for a period of 2 hours at 4 separate locations for recording $PM_{10}$ levels[3]. The results are provided in **Table 1-3** and **Table 1-4**. The results indicated decreased levels of $PM_{10}$ levels inside the power station than previously recorded with an average concentration value of 87.6 $\mu g/m^3$. However the concentration of $PM_{10}$ recorded outside the power station is higher than the ones recorded inside the power station with a value of 98$\mu g/m^3$. This location is at a distance of about 4km south from the existing stacks of power station adjacent to the Pat Feeder Canal.

The above argument is also validated by the results of air dispersion modeling (**Table 1-5**) which was carried out again in order to predict the ground level concentration value of $PM_{10}$ based on actual emission rate of this pollutant. A value of 4mg/Nm$^3$ is used as an input into the model instead of the previously used value of 50mg/Nm$^3$. As can be seen from the above mentioned table, Uch-II contribution in increasing the ambient levels of $PM_{10}$ is about 0.33% of the existing level for an averaging time period of 24 hours. Similarly Uch-1 $PM_{10}$ contribution in existing air shed is about 1% [4]. Hence it may

[3] 24 hours sampling was not carried out due to restricted access to the site due to recent floods.
[4] Uch-I $PM_{10}$ contribution in the ambient air is obtained by subtracting the 24 hour average concentration value of $PM_{10}$ as given in scenario-1 from the same value present in scenario-2 (**Table 1-3**)

be concluded that the raised levels of $PM_{10}$ is mainly due to the arid conditions surrounding the project site and the plant contribution in generating $PM_{10}$ levels is close to negligible.

The detail discussion on the results of air dispersion modeling is provided in **section 1.7.3**.

### *1.7.2 Particulate Matter Plant Emissions*

Particulate Matter has been mixed with $PM_{10}$ emissions in various sections of the EIA study. This mistake has been rectified in this study. In the EIA study a worst case value of 50mg/Nm$^3$ was assumed for $PM_{10}$ emission from the proposed power plant as the actual data was not available at that point in time. However, the actual PM levels are much less than this assumed value. The actual PM value is around 5mg/Nm$^3$ based on the PM emission testing of Uch-I on low BTU gas. This value is well within the limit of 50mg/Nm$^3$ as prescribed by IFC. Similarly, a value of 4mg/Nm$^3$ is used for $PM_{10}$ plant emissions. This value should be assumed for Uch-II for operations on low BTU gas wherever applicable after issuance of this addendum.

### *1.7.3 Air Dispersion Modeling*

Air dispersion modeling was again carried out in order to have a more realistic assessment based on actual value of PM. A stack emission concentration value of 4mg/Nm$^3$ for $PM_{10}$ was taken as an in put in to the dispersion model[5]. The following scenarios were modeled to predict the ground level concentration value of $PM_{10}$:

1. Proposed plant low BTU gas fired year round
2. Existing plant plus proposed plant low BTU gas fired year round
3. Existing plant HSD fired plus proposed plant low BTU gas fired year round

All other stack emission parameters as well as the meteorological data were the same as used in the EIA study. Predictions are made for the point of maximum concentration for 1 hour, 24 hour and annual time periods. The modeled values of all pollutants along with the assessment criteria for all scenarios are shown in **Table 1-5**. The modeling results for scenario-1 indicated that the increase in $PM_{10}$ concentration due to Uch-II plant operation is insignificant when the plant is operated on low BTU Gas and accounts to about 0.29µg/m$^3$ and 0.056µg/m$^3$ for averaging time periods of 24hours and annual respectively. Moreover, these predicted ground level concentration values of $PM_{10}$ are also complying with the criteria as set by IFC (i.e. should not exceed 25% of the NEQS/WHO). The assessment criteria are also complied with for scenarios 2 and 3

[5] The stack emission parameter of PM10 has been used instead of PM as ambient air quality guidelines are provided for PM10 only. Its value was assumed at 80% of the actual PM emissions for this analysis

when Uch-I and Uch-II are operated simultaneously on low BTU gas and a combination of HSD and low BTU gas respectively.

The cumulative values (i.e. existing background + predicted values) of these pollutants and the guideline values are provided in **Table 1-6**.[6] Interpretation of the data indicates that the cumulative values of NOx and SOx are well below the guideline limits of NEQS and WHO for all the scenarios. However, the values of $PM_{10}$ are exceeding the WHO guideline values but are within the WHO interim target of 150µg/m$^3$. The same is also within the guideline value of 150 µg/m$^3$ as prescribed by USEPA. The elevated $PM_{10}$ level is due to high back ground levels of the same due to prevailing arid conditions whereas the plant contribution in generating $PM_{10}$ levels is insignificant as authenticated by the modeling results.

## 1.8 *Noise Exposure*

### 1.8.1 *Environmental Noise*

Ambient noise monitoring was carried outside existing plant boundary to determine the impact on communities present within close proximity to the power plant. The noise monitoring was performed by the proponent and was carried out for a period of one hour (during day and night time) at each of these locations[7]. The noise locations are marked in **Figure 1-1**. The results indicate that the existing average day time noise level at these locations are complying with the NEQS guideline value of 85dB(A) as well as with the WHO guideline value of 55dB(A) for day time and 45 dB(A) for night time. Furthermore, cumulative noise impact (i.e. noise generated due to Uch-I +Uch-II operations) was also calculated by doubling the recorded noise levels[8]. These results are also complying with WHO guideline values except for site-1 where the nighttime guideline value is exceeded. However, this location cannot be considered as a sensitive receptor as it lies in a non-residential area. Further more, the noise levels at all the locations are also complying with the second criteria set by WHO which states that the ambient noise levels should not be increased by more than 3dB(A).

Results of the noise monitoring are provided in **Table 1-7**

### 1.8.2 *Occupational Noise*

Principal sources of noise in power plant may include the turbine, generators and auxiliaries; boilers and auxiliaries, fans and ductwork; pumps; compressors; condensers; precipitators, including rappers and plate vibrators; piping and valves; motors; transformers; circuit breakers; and cooling towers.

[6] The background levels also contain Uch-I contribution thus resulting in its duplication for scenario-2 in **Table 1-6**. However this affect is negligible as the contribution from Uch-I is insignificant.

[7] Noise monitoring for a 24 hour period was not carried out due to restricted access to the site from recent flooding

[8] The operations of Uch-II Power Station will approximately double the existing noise source. Thus the increase in the ambient noise level will not be more than 2 to 3 dB(A). Source: Introduction to Environmental Engineering, page 506-507

The exact noise levels due to operations of various plant equipments are not known at present. However it is anticipated that the plant noise will be on a higher side and in some areas even higher than the IFC guideline limit of 85dB(A). Plant noise levels will be reduced by use of following engineering control measures:

- Noisy equipment such as turbines will be placed inside acoustic enclosures;
- Selecting structures according to their noise isolation effect to envelop the building;
- Using mufflers or silencers in intake and exhaust channels;
- Using sound absorptive materials in walls and ceilings;
- Using vibration isolators and flexible connections (e.g., helical steel springs and rubber elements);
- Applying a carefully detailed design to prevent possible noise leakage through openings or to
- Minimise pressure variations in piping;
- Modification of the plant configuration or use of noise barriers such as berms and vegetation to limit ambient noise at plant property lines

Moreover, employees exposed to a noise levels greater than 85dB(A) for more 8 hours per day will be issued with hearing protective devices capable of reducing sound levels at the ear to at least 85 dB(A), and the wearing of such will be strictly enforced. These may include ear muffs and ear plugs.

The peak noise level that employees will be exposed to will be the one inside the gas turbine enclosure with an estimated value of up to 105dB(C)[9]. This value is well below the peak noise level of 140dB(C) as specified in the General EHS guidelines published by IFC. Moreover, the gas turbines will be housed inside the acoustic enclosure and worker entry to this area during its operation will be restricted. Furthermore, adherence to the engineering control measures mentioned above along with provision of adequate hearing protection devices will ensure that workers are not exposed to this high noise level.

## *1.9 Reversibility Affect Correction*

Some of the impacts will not necessarily be reversible as provided in the EIA report[10]. These may include the impacts related with air and Green House Gas (GHG) emissions, land and ground water contamination. These impacts should therefore be interpreted as irreversible in the impact characteristic matrix provided in **Tables 8-7**, **8-8** and **ES-1** of the EIA report.

[9] This value is recorded in the turbine area during Uch-I Power Station Operation.
[10] This was basically a typographical mistake.

## 1.10 Community Consultations

Community consultation was also carried out as part of the EIA study. More than 100 communities within a 10km radius of the proposed project site were consulted. Details of the community consultations are provided in the EIA study (**Section 6.2**). The list of the various communities consulted along with dates is provided in **Table 1-8**.

**Table 1-1: Schedule of construction activities**

| Activity | Start | Complete |
|---|---|---|
| Mobilisation | January 2011 | December 2012 |
| Civil Works | April 2011 | October 2012 |
| Demobilization | January 2012 | August 2013 |
| Start up | July 2012 | May 2013 |
| Testing | January 2013 | June 2013 |
| Turn Over | May 2013 | July 2013 |

**Table 1-2: List of Floral species with conservation status**

| **Family Name** ***Plant Specie*** | **Local Name** | **Life-Form** | **Life-Span** | **IUCN Rating*** |
|---|---|---|---|---|
| **Cyperaceae** | | | | |
| *Cyperus rotundus* | Kabuh | Sedge | Perennial | LC |
| *Cyperus specie* | | Sedge | Perennial | N/A |
| **Poaceae** | | | | |
| *Cynodon dactylon* | Chhabar | Grass | Perennial | N/A |
| *Dactyloctenium aegyptium* | Gandheer Gaah | Grass | Annual | N/A |
| *Desmostachya bippinata* | Drabh | Grass | Perennial | N/A |
| *Eragrostis minor* | Makhni Gaah | Grass | Annual | N/A |
| *Ochthochloa compressa* | Gandheer Gaah | Grass | Perennial | N/A |
| *Oryza sativa* | Saari | Grass | Annual | N/A |
| *Panicum antidotale* | jhim | Grass | Perennial | N/A |
| *Phragmites karka* | naaro | Grass | Perennial | N/A |
| *Saccharum bengalense* | Booro | Grass | Perennial | N/A |
| *Saccharum spontaneum* | Booro/Munian | Grass | Perennial | N/A |
| *Setaria ipalica* | Bajari | Grass | Annial | N/A |
| *Sporobolus spcie* | | Grass | Perennial | N/A |
| *Sorghum bicolor* | Jowar | Grass | Annual | N/A |
| *Triticum aestivum* | Gandum | Grass | Annual | N/A |
| *Veazea nays* | Makae | Grass | Annual | N/A |
| **Aizoaceae** | | | | |

| **Family Name** ***Plant Specie*** | **Local Name** | **Life-Form** | **Life-Span** | **IUCN Rating*** |
|---|---|---|---|---|
| *Limeum indicum* | Dhoor Chhapri | Herb | Annual | N/A |
| *Zelya petandra* | Wasanh/Waho | Herb | Annual | N/A |
| **Asclepiadaceae** | | | | |
| *Calotropis procera* | Ak | Shrub | Perennial | N/A |
| **Asteraceae** | | | | |
| *Conyza canadensis* | Gidar Buti | Herb | Annual | N/A |
| *Eclipta alba* | Daryi Booti | Herb | Annual | N/A |
| *Helianthus annuus* | Soorag mukhi | Shrub | Perennial | N/A |
| *Launaea procumbens* | Bhattar | Herb | Perennial | N/A |
| *Xanthium indicum* | Bhurt | Shrub | Annual | N/A |
| **Boraginaceae** | | | | |
| *Cordia myxa* | Lesuro | Small tree | Perennial | N/A |
| *Heliotropium europeum* | Uth Charo | Herb | Annual | N/A |
| **Capparidaceae** | | | | |
| *Cleome scaposa* | Khathoori | Herb | Annual | N/A |
| **Chenopodiaceae** | | | | |
| *Saueda nudiflora* | Lano | Sub-shrub | Semi-perennial | N/A |
| *Saueda fruticosa* | Lani | Sub-shrub | Semi-perennial | N/A |
| **Convolvulaceae** | | | | |
| *Cressa cretica* | Oin | Herb | Herb | N/A |
| *Convolvulus arvensis* | Naro | Climbing herb | Herb | N/A |
| *Cucumis melo* | Mitero | Prostrate herb | Annual | N/A |
| **Euphorbiaceae** | | | | |
| *Euphorbia thymifolia* | | | | N/A |
| *Euphorbia hirta* | Kheer Wal | Herb | Annual | N/A |
| *Ricinus communis* | | | | N/A |
| **Fabaceae** | | | | |
| *Alhagi maurorum* | Kandero | Sub-shrub | Perennial | N/A |
| *Dalbergia sissoo* | Taari | Tree | Perennial | N/A |
| **Liliaceae** | | | | |
| *Allium cepa* | Peyaz | Herb | Annual | N/A |

| **Family Name** ***Plant Specie*** | **Local Name** | **Life-Form** | **Life-Span** | **IUCN Rating*** |
|---|---|---|---|---|
| **Malvaceae** | | | | |
| *Abutilon indicum* | Pat Teer | Shrub | Perennial | N/A |
| **Mimosaceae** | | | | |
| *Acacia nilotica* | Sindhi Babur | Tree | Perennial | N/A |
| *Albizia lebbeck* | Sarianh | Tree | Perennial | N/A |
| *Prosopis cineraria* | Kandi | Tree | Perennial | N/A |
| *Prosopis juliflora* | Devi | Shrub | Perennial | N/A |
| **Molluginaceae** | | | | |
| *Glinus lotoides* | | Herb | Perennial | N/A |
| **Rhamnaceae** | | | | |
| *Zizyphus mauritiana* | Jhangoori Ber | Shrub | Perennial | N/A |
| **Solanaceae** | | | | |
| *Lycopersicom sesculeupum* | Tamator | Shrubb | Annual | N/A |
| *Solanum melonjina* | Wagan | Shrub | Annual | N/A |
| *Solanum surattense* | Kanderi Wal | Sub-shrub | Annual | N/A |
| **Tamaricaceae** | | | | |
| *Tamarix aphylla* | Lawo | Tree | Perennial | N/A |
| Tamarix indica | Laie | Larg shrub | Perennial | N/A |
| **Verbenacea** | | | | |
| *Phyla nodiflora* | Bukkan | Herb | Annual | N/A |
| **Typhaceae** | | | | |
| *Typha domingenasis* | Pan | Rush | Perennial | N/A |
| *Typha elephantina* | Pan | Rush | Perennial | N/A |
| **Zygophyllaceae** | | | | |
| *Fagonia indica* | Dramaho | Herb | Annual | N/A |
| *Fagonia bruguieri* | Dramaho | Herb | Annual | N/A |

LC: Least Concern

N/A: Not Available

*Source: http://www.iucnredlist.org/apps/redlist/search

**Table 1-3: Ambient air quality monitoring results of $PM_{10}$ inside Uch Power Station**

| Location | Value (µg/m³) |
|---|---|
| Residential Colony | 83.0 |
| Tariq check post | 86.0 |
| Ghaznavi Check Post | 94.0 |
| **Average** | **87.6** |

**Table 1-4: Ambient air quality monitoring result outside Uch Power Station[a]**

| Location | Value (µg/m³) |
|---|---|
| Near Pat Feeder Canal | 98.0 |

a: This location lies at a distance of about 4km from the Uch-1 Power Station stacks in southern direction.

**Table 1-5: Comparison of ambient air quality guidelines with modeled values (µg/m³)**

| Scenarios | Pollutant | Assessment Criteria | | | Modeled Values | | |
|---|---|---|---|---|---|---|---|
| | | **1hr** | **24hr** | **Annual** | **1hr** | **24hr** | **Annual** |
| Scenario-1 | $SO_x$ | - | 50.00 | 12.50 | 0.44 | 0.24 | 0.04 |
| | $NO_x$ | 50.00 | - | 25.00 | 10.93 | 5.91 | 1.08 |
| | $PM_{10}$ | - | 12.50 | 5.00 | 0.56 | 0.29 | 0.056 |
| | CO | - | - | - | 4.26 | 2.3 | 0.42 |
| Scenario-2 | $SO_x$ | | 200.00 | 50.00 | 1.49 | 0.89 | 0.16 |
| | $NO_x$ | 200.00 | | 100.00 | 43.15 | 26.01 | 4.74 |
| | $PM_{10}$ | | 50.00 | 20.00 | 1.95 | 1.17 | 0.21 |
| | CO | | | | 22.7 | 13.92 | 2.53 |
| Scenario-3 | $SO_x$ | | 200.00 | 50.00 | 168.42 | 87.35 | 15.74 |
| | $NO_x$ | 200.00 | | 100.00 | 56.44 | 33.93 | 6.17 |
| | $PM_{10}$ | | 50.00 | 20.00 | 18.44 | 9.78 | 1.76 |
| | CO | | | | 5.59 | 4.11 | 0.76 |

**Table 1-6: Comparison of ambient air quality guidelines with cumulative values (μg/m³)**

| Scenarios | Pollutant | Guideline Values 1hr | Guideline Values 24hr | Guideline Values Annual | Cumulative Values 1hr | Cumulative Values 24hr | Cumulative Values Annual |
|---|---|---|---|---|---|---|---|
| Scenario-1 | $SO_x$ | | 200.00 | 50.00 | 4.94 | 3.65 | 0.04 |
| | $NO_x$ | 200.00 | | 100.00 | 23.54 | 13.54 | 1.08 |
| | $PM_{10}$ | | 50.00 | 20.00 | 0.56 | 90.54 | 0.056 |
| | CO | | | | 4.26 | 2.30 | 0.42 |
| Scenario-2 | $SO_x$ | | 200.00 | 50.00 | 5.99 | 4.30 | 0.16 |
| | $NO_x$ | 200.00 | | 100.00 | 55.76 | 33.64 | 4.74 |
| | $PM_{10}$ | | 50.00 | 20.00 | 1.95 | 91.42 | 0.21 |
| | CO | | | | 22.70 | 13.92 | 2.53 |
| Scenario-3 | $SO_x$ | | 200.00 | 50.00 | 172.92 | 90.76 | 15.74 |
| | $NO_x$ | 200.00 | | 100.00 | 69.05 | 41.56 | 6.17 |
| | $PM_{10}$ | | 50.00 | 20.00 | 18.44 | 100.03 | 1.76 |
| | CO | | | | 5.59 | 4.11 | 0.76 |

Notes:

The modeled (**Table 1-5**) values are added in the average background level as provided in **Table 1-3** and **1-4** to get the cumulative values for $PM_{10}$. The values of other pollutants are the same as provided in the EIA study.

The background levels also contain Uch-I contribution thus resulting in its duplication for scenario-2. However this affect is negligible as the contribution from Uch-I is insignificant

**Table 1-7: Existing and cummulative noise monitoring results**

| Monitoring Site | Existing Noise Levels[a] (dBA) | | Cummulative Noise[b] Levels (dBA) | |
|---|---|---|---|---|
| | Daytime 07:00 – 22:00 | Nighttime 22:00 – 07:00 | Daytime 07:00 – 22:00 | Nighttime 22:00 – 07:00 |
| Site 1 | 46.0 | 45.0 | 49.0 | 48.0 |
| Site 2 | 36.1 | 39.3 | 39.1 | 42.3 |
| Site 3 | 35.3 | 39.0 | 38.3 | 42.0 |
| Site 4 | 36.5 | 37.8 | 39.5 | 40.8 |
| Site 5 | 37.8 | 39 | 40.8 | 42.0 |
| Site 6 | 34.0 | 43.1 | 37.0 | 46.1 |
| Site 7 | 40.01 | 38 | 43.01 | 41.0 |
| Site 8 | 41.6 | 42.3 | 44.6 | 45.3 |
| Site 9 | 43.3 | 41.5 | 46.3 | 44.5 |
| Site 10 | 39.8 | 42.0 | 42.8 | 45.0 |

Notes:

a: These are the measured noise levels when Uch-I Power Station is in operation

b: These are the estimated noise levels when Uch-I and Uch-II Power Stations will be in operation simultaneously

**Table 1-8: List of communities consulted**

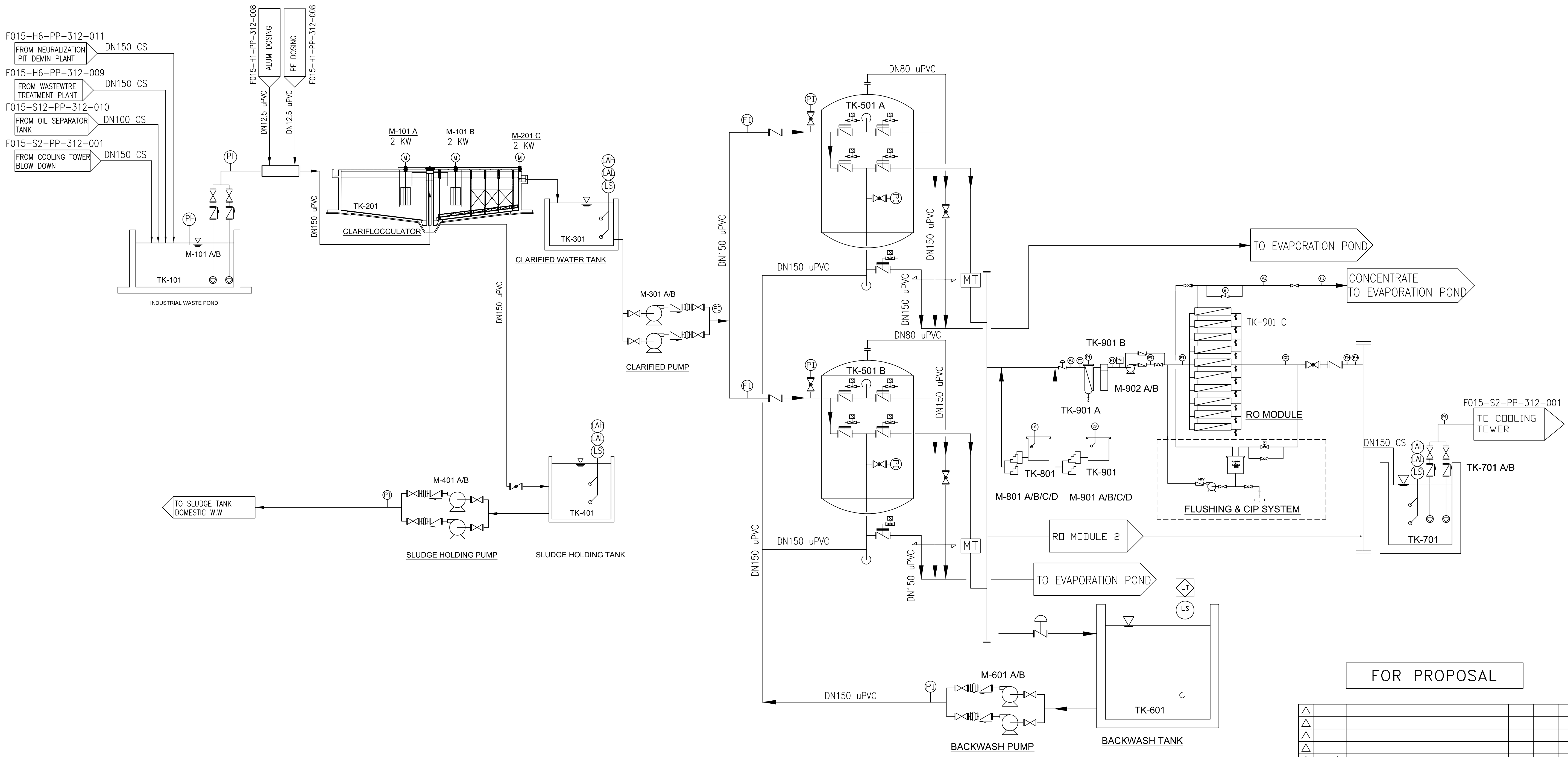
| Sr. No. | Village Name | Consutlation Dates |
|---|---|---|
| 1 | Gohramabad | 15th November 2007 |
| 2 | Habibullah Lango | 15th November 2007 |
| 3 | Mir Abdul Ghafoor Lehri | 15th November 2007 |
| 4 | Ghulam Rasool Lehri | 15th November 2007 |
| 5 | Haji Wahid Bux | 15th November 2007 |
| 6 | Haji Abdul Fatah Rind | 15th November 2007 |
| 7 | Abdul Qadir Zahri | 15th November 2007 |
| 8 | Yaqoob Mengal | 15th November 2007 |
| 9 | Muhammad Chuttal Lak | 15th November 2007 |
| 10 | Ayub Mengal | 15th November 2007 |
| 11 | Abdul Khaliq Jamali | 15th November 2007 |
| 12 | Khamisa Khan Kia-zai | 15th November 2007 |
| 13 | Hussainabad Bhanger | 15th November 2007 |
| 14 | Abdul Khaliq Lango | 15th November 2007 |
| 15 | Jan Muhammad Jamali | 15th November 2007 |
| 16 | Raees Mahmood | 15th November 2007 |
| 17 | Saifullah Jamali | 15th November 2007 |
| 18 | Noor Lehri | 15th November 2007 |
| 19 | Muhammad Sultan | 15th November 2007 |
| 20 | Muhammad Murad | 15th November 2007 |
| 21 | Haji Nihal Khan | 15th November 2007 |
| 22 | Jumma Khan Pandrani | 15th November 2007 |
| 23 | Shahbaz Khan | 15th November 2007 |
| 24 | Lashkar Khan Mugairi | 16th November 2007 |
| 25 | Abdul Fatah Ramdani | 16th November 2007 |
| 26 | Khan Kaprani | 16th November 2007 |
| 27 | Amanullah Bugti | 16th November 2007 |
| 28 | Faiq Khan Jamali | 16th November 2007 |
| 29 | Taj Muhammad Jamali | 16th November 2007 |
| 30 | Haji Rehmat | 16th November 2007 |

| Sr. No. | Village Name | Consutlation Dates |
|---|---|---|
| 31 | Haji Rehmatullah Sasoli | 16th November 2007 |
| 32 | Mir Abdul Qadir Khan Jamali | 16th November 2007 |
| 33 | Rehmatullah Khosa | 16th November 2007 |
| 34 | Arbab Mengal | 16th November 2007 |
| 35 | Muhammad Khair Pirkani | 16th November 2007 |
| 36 | Azizullah Pirkani | 16th November 2007 |
| 37 | Miran Bux Bugti | 16th November 2007 |
| 38 | Haji Ijaz | 16th November 2007 |
| 39 | Haji Rustam Pandrani | 16th November 2007 |
| 40 | Long Bangul-zai | 16th November 2007 |
| 41 | Shamsul-Haq Lahri | 16th November 2007 |
| 42 | Daria Khan Jamali | 16th November 2007 |
| 43 | Dilawar Bugti | 16th November 2007 |
| 44 | Muhammad Anwar Kia--Zai | 16th November 2007 |
| 45 | Shahan Khan Bugti | 16th November 2007 |
| 46 | Sanja Jamali | 16th November 2007 |
| 47 | Fazal Muhammad Jamali | 16th November 2007 |
| 48 | Haji Hraoon Jakhrani | 16th November 2007 |
| 49 | Ghulam Qadir Mughairi | 16th November 2007 |
| 50 | Gul Hassan | 16th November 2007 |
| 52 | Norez Khan Jamali | 17th November 2007 |
| 52 | Abdul Aziz Bugti | 17th November 2007 |
| 53 | Molla Bux Lango | 17th November 2007 |
| 54 | Abdul Ghafoor Bugti | 17th November 2007 |
| 55 | Sardar Khan Mughari | 17th November 2007 |
| 56 | Mustafa Mughari | 17th November 2007 |
| 57 | Ghulam Mustafa Mughari | 17th November 2007 |
| 58 | Khuda Bux Jatak | 17th November 2007 |
| 59 | Taj Muhammad Domki | 17th November 2007 |
| 60 | Murad Bugti | 17th November 2007 |
| 61 | Haji Rahman | 17th November 2007 |
| 62 | Muhammad Siddiq | 17th November 2007 |

| Sr. No. | Village Name | Consutlation Dates |
|---|---|---|
| 63 | Azizabad | 17th November 2007 |
| 64 | Muhammad Mugsi | 17th November 2007 |
| 65 | Abrar Khan Abro | 17th November 2007 |
| 66 | Habibullah Bangul-zai | 17th November 2007 |
| 67 | Shukat Bangul-zai | 17th November 2007 |
| 68 | Khair Bux | 18th November 2007 |
| 69 | Muhammad Bangul-zai | 18th November 2007 |
| 70 | Soofi Abdul Hamid | 18th November 2007 |
| 71 | Killi Abdul Salam | 18th November 2007 |
| 72 | Nazar Muhammad Domki | 18th November 2007 |
| 73 | Sohbat Khan Jakhrani | 18th November 2007 |
| 74 | Lanja Khan Jakhrani | 18th November 2007 |
| 75 | Bhuta Khan Jatak | 18th November 2007 |
| 76 | Mir Asad Khan Jamali | 18th November 2007 |
| 77 | Abdul Ghafoor Bhangar | 18th November 2007 |
| 78 | Abdul Karim Bangul-zai | 18th November 2007 |
| 79 | Rehmatullah | 18th November 2007 |
| 80 | Babu Khaskhali | 18th November 2007 |
| 81 | Azizullah Baharani | 18th November 2007 |
| 82 | Muhammad Aslam Jatak | 18th November 2007 |
| 83 | Habibullah Bangul-zai | 18th November 2007 |
| 84 | Jeewan khan Bahrani | 18th November 2007 |
| 85 | Dargahi Khosa | 18th November 2007 |
| 86 | Bakhir Khosa | 18th November 2007 |
| 87 | Qamar Din | 18th November 2007 |
| 88 | Nisar Khan | 18th November 2007 |
| 89 | Mir Khan Khoso | 18th November 2007 |
| 90 | Bahawal Khan | 18th November 2007 |
| 91 | Bahadur Khan | 18th November 2007 |
| 92 | Piara Khan | 18th November 2007 |
| 93 | Sohbat Khan | 19th November 2007 |
| 94 | Faiz Muhammad khan Jamali | 19th November 2007 |

| Sr. No. | Village Name | Consutlation Dates |
|---|---|---|
| 95 | Kutab Din Jamali | 19th November 2007 |
| 96 | Ghulam Haider Jakhrani | 19th November 2007 |
| 97 | Mir Abdul Ghafoor | 19th November 2007 |
| 98 | Killi Bangul-zai | 19th November 2007 |
| 99 | Khudadad | 19th November 2007 |
| 100 | Dastgirabad | 19th November 2007 |
| 101 | Sooba Khan Jatak | 19th November 2007 |
| 102 | Muhammad Siddiq Bangul-zai | 19th November 2007 |
| 103 | Bachal Mughairi | 19th November 2007 |

| TAG NO. | TK-101 | TK-201 | TK-301 | TK-401 | TK-501 A/B | TK-601 | TK-701 | TK-801 | TK-901 | TK-901 A | TK-901 B | TK-901 C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DESCRIPTION | INDUSTRIAL WASTE POND | CLARIFLOCCULATOR | CLARIFIED WATER TANK | SLUDGE HOLDING TANK | SAND FILTER | BACKWASH TANK | RO WATER TANK | CHEMICAL TANK | ANTISCALANT TANK | BAG FILTER | CARTRIDGE FILTER | PRESSURE VESSEL |
| DIMENSION (m) | 14x9.6x8.2 | d1=4.3x4 d2=9.4x4 | 3x3x3.5 | 3x3x3.5 | ø3.0x3.1mSH | ø5.0x3.0 | 3.0x3.0x3.5 | ---- | ---- | ---- | ---- | ---- |
| CAPACITY ($m^3$/h) | -- | 400 $m^3$/hr | --- | --- | -- | -- | -- | -- | 500 GALLONS | 15 MICRON | 100 m/hr 5 MICRON | 400 psi |
| OPERATING PRESSURE | -- | ATMOS | --- | ATMOS | 4 bar | --- | --- | --- | --- | --- | --- | --- |
| MATERIAL | RCC | RCC | RCC | RCC | CS & E.COATED | RCC | RCC | POLYETHYLENE | POLYETHYLENE | SS 316 | SS 316 | FRP |
| QTY. | 01 | 01 | 01 | 01 | 02 | 01 | 01 | 01 | 01 | 4(2D+2S) | 4(2D+2S) | -- |




FOR PROPOSAL

| REV. | DATE | DESCRIPTION | DRAWN | CHKD | APPD |
|---|---|---|---|---|---|
| A | JULY 05,'08 | FOR PROPOSAL | AKMAL | KM | MAB |

OWNER
UCH POWER (PRIVATE) LIMITED
PAKISTAN

PROJECT TITLE:
UCH POWER EXPANSION PROJECT

CONTRACTOR:
HYUNDAI ENGINEERING CO.,LTD.
DESCON ENGINEERING LIMITED

| | | |
|---|---|---|
| DRAWN BY | AKMAL | DATE JULY 05,'08 |
| CHECKED BY | KASHIF | DATE JULY 05,'08 |
| APPROVED BY | M.A.BUTT | DATE JULY 05,'08 |

TITLE:
REVERSE OSMOSIS SYSTEM

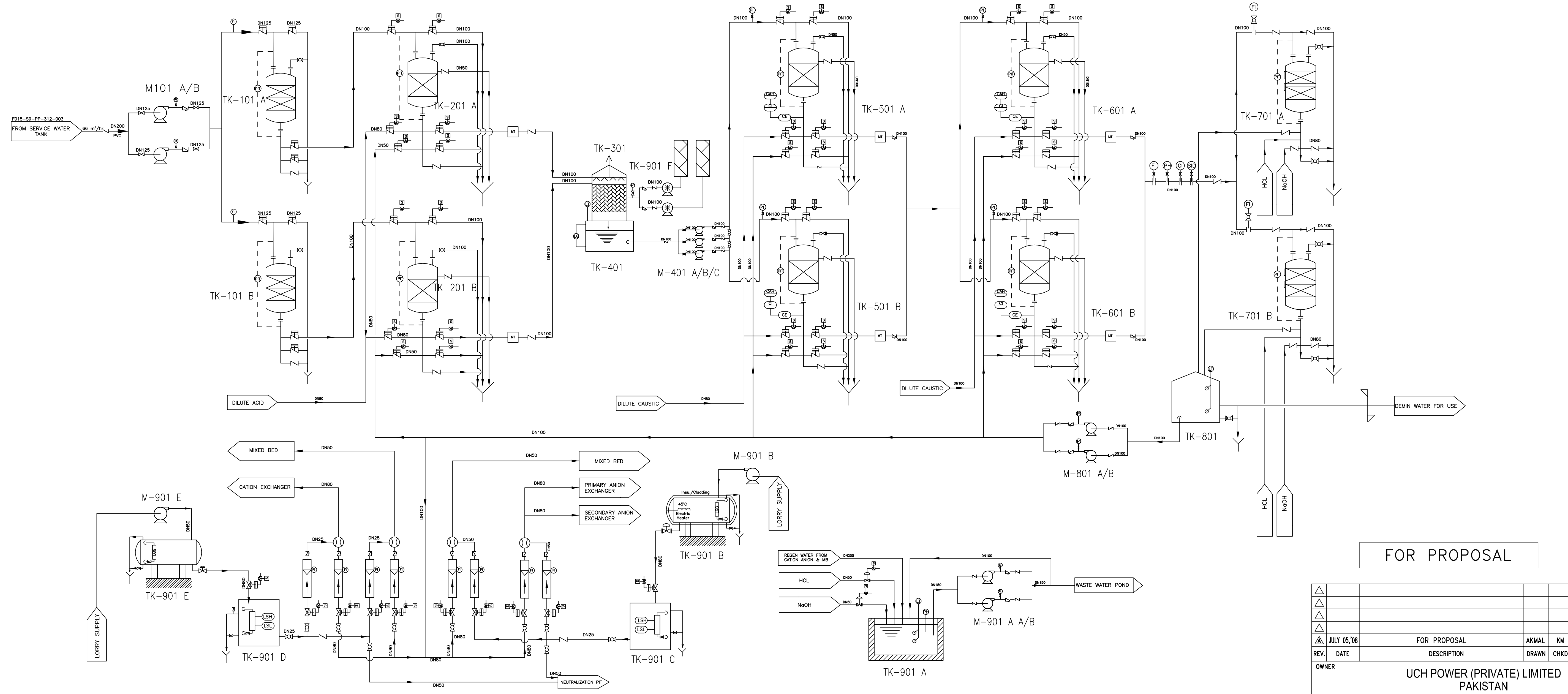
| PROJECT NO. | CONTRACT NO. | AREA CODE | SCALE | DRAWING NUMBER | REV. |
|---|---|---|---|---|---|
| 8804 | - | - | 1:1 | 8804-H8-PP-312-013 | A |

A3 (594x841mm)

| TAG NO. | M-101 A/B | MK-201 A/B | M-201 C | M-301A/B | M-401 A/B | M-601 A/B | M-701 A/B | M-801 A/B/C/D | M-901 A/B/C/D | M-902 A/B |
|---|---|---|---|---|---|---|---|---|---|---|
| DESCRIPTION | INDUSTRIAL WASTE POND PUMP | MOTER WITH PADDLE FLOCCULATOR | SLUDGE SCRAPPER | CLARIFIED WATER PUMP | SLUDGE HOLDING TANK PUMP | BACKWASH PUMP | RO PUMP | CHEMICAL DOSING PUMP | CHEMICAL DOSING PUMP | HIGH PRESSURE PUMP |
| DIMENSION (m) | --- | ø3.2x3.2 | 15.0 m | --- | -- | -- | -- | -- | -- | -- |
| CAPACITY ($m^3$/h) | 100$m^3$/hr x 15mH | 4 RPMx2KW | 1 RPHx2KW | 100 $m^3$/hr x 25mH | 100 $m^3$/hr x 25mH | 100 $m^3$/hr x 25mH | 50 $m^3$/hr x 25mH | 5 $m^3$/hr x 70mH | 5 $m^3$/hr x 70mH | 100 $m^3$/hr x 200mH |
| OPERATING PRESSURE | | -- | --- | | | | | | | |
| MATERIAL | -- | HOT DIP GALVINIZED IRON | HOT DIP GALVINIZED IRON | CI | CI | CI | CI | PE | PE | -- |
| QTY. | 2(1D+1S) | 02 | 01 | 2(1D+1S) | 2(1D+1S) | 2(1D+1S) | 2(1D+1S) | 4(2D+2S) | 4(2D+2S) | 2(1D+1S) |

| TAG NO. | TK-101 A/B | TK-201 A/B | TK-301 | TK-401 | TK-501 A/B | TK-601 A/B | TK-701 A/B | TK-801 | TK-901 A |
|---|---|---|---|---|---|---|---|---|---|
| DESCRIPTION | DUAL MEDIA FILTERS | CATION EXCHANGER | DEGASIFIER TOWR | BREAK TANK | PRIMARY ANION EXCHANGER | SCONDARY ANION EXCHANGER | MIXED BED POLISHER | DEMINERALIZED WATER STORAGE TANK | NEUTRALIZATION PIT |
| DIMENSION (m) | ø2.9x2.6 | 2.2x2.9mH | ø2.1x3.0smH | 2.6x2.3 | ø1.9x2.9msH | ø1.9x2.9msH | 2.1x2.9mL | 22.6x8.0msH | 8.0x4.0x3.0 |
| CAPACITY ($m^3$/h) | 65$m^3$/hr each | 65$m^3$/hr each | 65$m^3$/hr each | --- | 65$m^3$/hr each | 65$m^3$/hr each | 65$m^3$/hr each | 3000$m^3$ | 80 $m^3$ (net) |
| OPERATING PRESSURE | 3~4 bar | -- | -- | -- | -- | -- | -- | -- | -- |
| MATERIAL | CS inside RL | CS inside RL outside EX. | FRP | RCC | CS inside RL outside EX. | CS inside RL outside EX. | MS | CS inside RL outside Ex. | RCC |
| QTY. | 02 | 2(1D+1S) | 01 | 01 | 02 | 02 | 02 | 01 | 01 |

| TAG NO. | TK-901 B | TK-901 C | TK-901 D | TK-901 E | TK-901 F |
|---|---|---|---|---|---|
| DESCRIPTION | BULK CAUSTIC STROAGE TANK | NaOH MEASURING TANK (AE) | Hcl MEASURING TANK (CE) | BULK ACID STORAGE TANK | BLOWER AIR FAN |
| DIMENSION (m) | --- | -- | -- | ø2.6x3.0msH | Head 100mm$H_2O$ |
| CAPACITY ($m^3$/h) | 20$m^3$ | 1000 L | 1500 L | 40$m^3$ | 100 $Nm^3$/hr (each) |
| OPERATING PRESSURE | -- | -- | -- | -- | -- |
| MATERIAL | CS+RL | FRP | FRP | CS+RL | CS+RL |
| QTY. | 01 | 01 | 01 | 01 | 2(1D+1S) |




| TAG NO. | TK-101 A/B | M-401 A/B/C | M-801 A/B | M-901 A A/B | M-901 B | M-901 E |
|---|---|---|---|---|---|---|
| DESCRIPTION | RAW WATER PUMPS | DEGASIFIER WATER PUMP | REGENERATION PUMP | NEUTRALIZED DISPOSAL PUMP | NaOH UNOADING PUMP | Hcl UNOADING PUMP |
| DIMENSION (m) | --- | ---- | -- | -- | ---- | -- |
| CAPACITY ($m^3$/h) | 65$m^3$/hrx40mH | 33$m^3$/hrx20mH | 65$m^3$/hrx30mH | 80$m^3$/hrx25mH | 30$m^3$/hrx20mH | 30$m^3$/hrx20mH |
| OPERATING PRESSURE | -- | -- | -- | -- | -- | -- |
| MATERIAL | -- | --- | -- | -- | -- | -- |
| QTY. | 2(1D+1S) | 3(2D+1S) | 2(1D+1S) | 2(1D+1S) | 01 | 01 |

FOR PROPOSAL

| REV. | DATE | DESCRIPTION | DRAWN | CHKD | APPD |
|---|---|---|---|---|---|
| A | JULY 05,'08 | FOR PROPOSAL | AKMAL | KM | MAB |

OWNER: UCH POWER (PRIVATE) LIMITED PAKISTAN

PROJECT TITLE: UCH POWER EXPANSION PROJECT

CONTRACTOR: HYUNDAI ENGINEERING CO.,LTD. DESCON ENGINEERING LIMITED

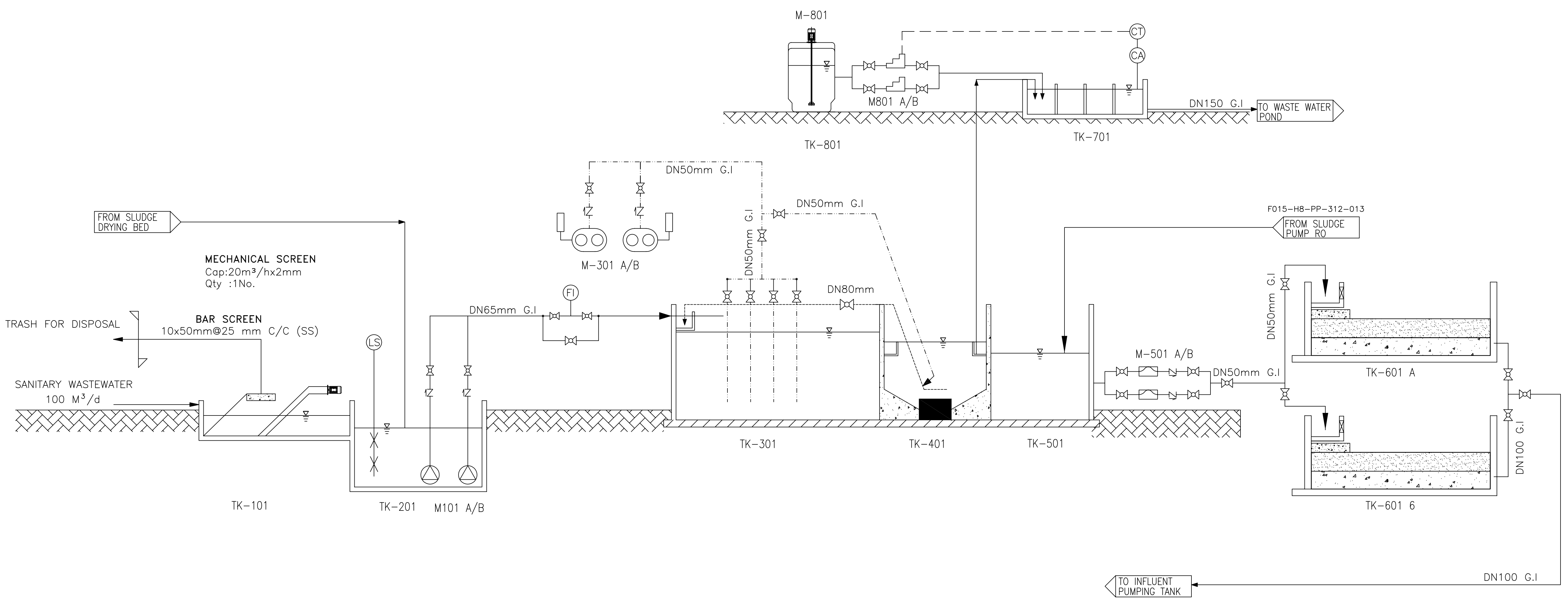
| DRAWN BY | DATE |
|---|---|
| AKMAL | JULY 05,'08 |
| CHECKED BY | DATE |
| KASHIF | JULY 05,'08 |
| APPROVED BY | DATE |
| M.A.BUTT | JULY 05,'08 |

TITLE: MAKE-UP WATER DEMINERALIZER SYSTEM

| PROJECT NO. | CONTRACT NO. | AREA CODE | SCALE | DRAWING NUMBER | REV. |
|---|---|---|---|---|---|
| 8804 | - | - | 1:1 | 8804-H6-PP-312-012 | A |

A3 (297x420mm)

| TAG NO. | TK-101 | TK-201 | TK-301 | TK-401 | TK-501 | TK-601 A/B | TK-701 | TK-801 |
|---|---|---|---|---|---|---|---|---|
| DESCRIPTION | SCREEN CHANNEL | INFLUENT PUMPING TANK | AERATION TANK | SECONDARY CLARIFIER | SLUDGE TANK | SLUDGE DRYING BED | CHLORINE CONTACT TANK | NaoCl TANK |
| DIMENSION (m) | 3.0x0.3x1.5 | 6.0x3.5x6.0 | 4x6x3.5 | 4X2.5X3.5 | 2.0x1.75x3.5 | 2.0x2.0x2.5 | 2.0x2.0x3.5 | --- |
| CAPACITY ($m^3/h$) | --- | --- | --- | --- | --- | --- | --- | 100L |
| OPERATING PRESSURE | -- | -- | -- | -- | -- | -- | -- | -- |
| MATERIAL | RCC | RCC | RCC | RCC | RCC | RCC | RCC | FRP |
| QTY. | 01 | 01 | 01 | 01 | (1+1) | 01 | 01 | 01 |




| TAG NO. | M-101 A/B | M-301 A/B | M-501 A/B | M-801 A/B | M-801 |
|---|---|---|---|---|---|
| DESCRIPTION | SUMP PUMP | AIR BLOWER | SLUDGE PUMP | NaOCl DOSING PUMP | MIXER |
| DIMENSION (m) | --- | --- | -- | -- | -- |
| CAPACITY ($m^3/h$) | 12.5 $m^3$/hrx10mH | 100 $m^3$/hrx4mAq | 10 $m^3$/hrx10mH | 50 $m^3$/hrx10mH | 30 RPMx0.45KW |
| OPERATING PRESSURE | -- | -- | -- | -- | -- |
| MATERIAL | -- | -- | -- | -- | -- |
| QTY. | 2(1D+1S) | 2(1D+1S) | 2(1D+1S) | 2(1D+1S) | 01 |

FOR PROPOSAL

| REV. | DATE | DESCRIPTION | DRAWN | CHKD | APPD |
|---|---|---|---|---|---|
| A | JULY 05,'08 | FOR PROPOSAL | AKMAL | KM | MAB |

OWNER

UCH POWER (PRIVATE) LIMITED
PAKISTAN

PROJECT TITLE:

UCH POWER EXPANSION PROJECT

CONTRACTOR:

HYUNDAI ENGINEERING CO.,LTD.
DESCON ENGINEERING LIMITED

| DRAWN BY | DATE |
|---|---|
| AKMAL | JULY 05,'08 |
| CHECKED BY | DATE |
| KASHIF | JULY 05,'08 |
| APPROVED BY | DATE |
| M.A.BUTT | JULY 05,'08 |

TITLE:

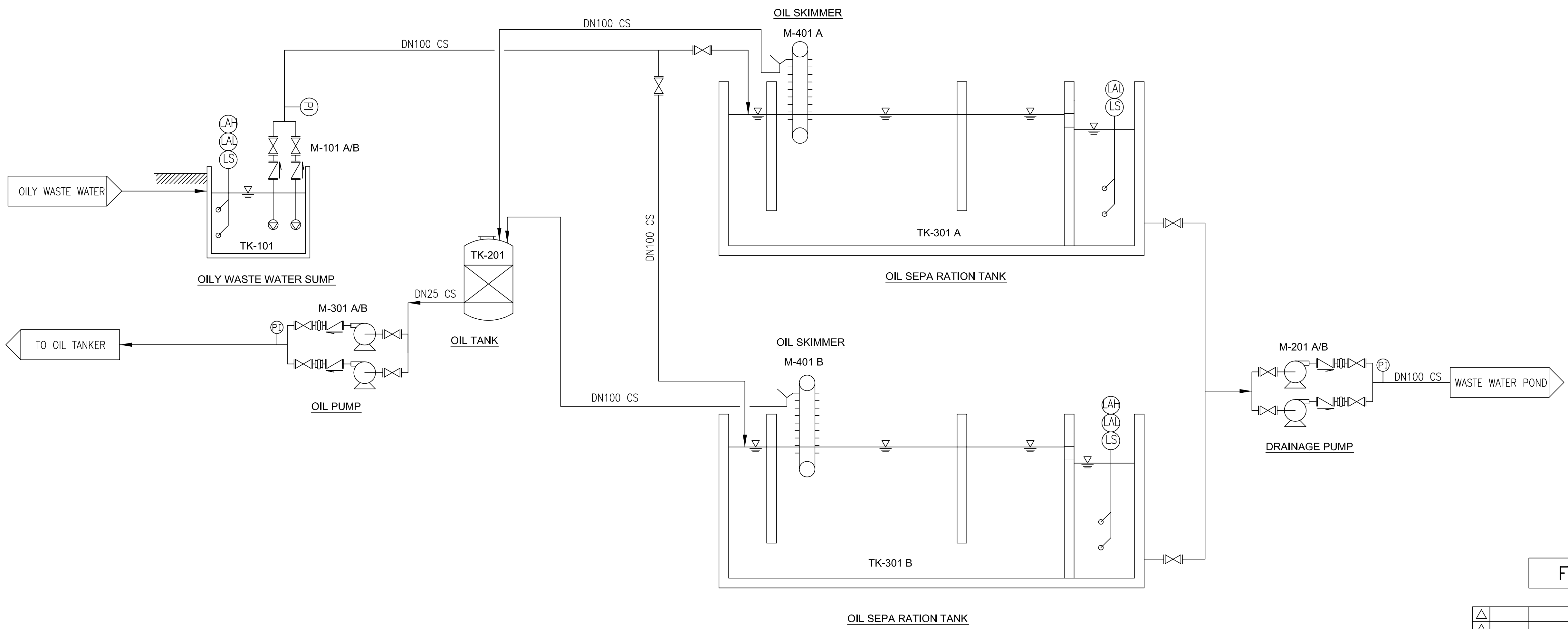
SANITARY WASTEWATER TREATMENT SYSTEM

| PROJECT NO. | CONTRACT NO. | AREA CODE | SCALE | DRAWING NUMBER | REV. |
|---|---|---|---|---|---|
| 8804 | - | - | 1:1 | 8804-S5-PP-312-010 | A |

A3 (297x420mm)

| TAG NO. | TK-101 | TK-201 | TK-301 A/B |
|---|---|---|---|
| DESCRIPTION | OILY WASTE WATER SUMP | OIL TANK | OIL SEARATION TANK |
| DIMENSION (m) | 6x6x3.5 | --- | 3.0x6.4x3.0 |
| CAPACITY ($m^3$/h) | -- | 1000 L | --- |
| OPERATING PRESSURE | -- | --- | --- |
| MATERIAL | RCC | PE | RCC |
| QTY. | 01 | 01 | 02 |

| TAG NO. | M-101 A/B | M-201 A/B | M-301 A/B | M-401 A/B |
|---|---|---|---|---|
| DESCRIPTION | OILY WASTE WATER PUMP | DRAINAGE PUMP | OIL PUMP | OIL SKIMMER |
| DIMENSION (m) | --- | ---- | --- | --- |
| CAPACITY ($m^3$/h) | 50 $m^3$/hrx25mHx8kw | 50 $m^3$/hrx25mHx8kw | 3$m^3$/hr x 15mHx1kw | 1L/hrx1kw |
| OPERATING PRESSURE | -- | --- | | -- |
| MATERIAL | -- | | -- | -- |
| QTY. | 2(1D+1S) | 2(1D+1S) | 2(1D+1S) | 02 |




FOR PROPOSAL

| REV. | DATE | DESCRIPTION | DRAWN | CHKD | APPD |
|---|---|---|---|---|---|
| A | JULY 05,'08 | FOR PROPOSAL | AKMAL | KM | MAB |

OWNER: UCH POWER (PRIVATE) LIMITED PAKISTAN

PROJECT TITLE: UCH POWER EXPANSION PROJECT

CONTRACTOR: HYUNDAI ENGINEERING CO.,LTD. DESCON ENGINEERING LIMITED

| DRAWN BY | DATE |
|---|---|
| AKMAL | JULY 05,'08 |
| CHECKED BY | DATE |
| KASHIF | JULY 05,'08 |
| APPROVED BY | DATE |
| M.A.BUTT | JULY 05,'08 |

TITLE: OILY WATER TREATMENT SYSTEM

| PROJECT NO. | CONTRACT NO. | AREA CODE | SCALE | DRAWING NUMBER | REV. |
|---|---|---|---|---|---|
| 8804 | - | - | 1:1 | 8804-S12-PP-312-011 | A |

A3 (297x420mm)

**Figure 1-1: Noise Monitoring Locations**