Environmental and Social Monitoring Report

Project Number: 43903-014
Annual Report (2014)
December 2014

Pakistan: Uch-II Power Project

Prepared by Uch-II Power (Private) Limited for the Asian Development Bank.

OPERATIONAL PHASE

ENVIRONMENTAL AND SOCIAL MONITORING REPORT

FY-2014

A	**Project/Business Name and Summary Information**	
	Development of 404 MW Gas Fired Combined Cycle Power Plant by Uch-II Power (Private) Limited	
(i)	*Location of project/business*	Dera Murad Jamali, Baluchistan, Pakistan
(ii)	*Nature*	Operation & Maintenance of low BTU gas fired combined cycle power plant.
(iii)	*Scale/size*	404 MW (ISO Gross Rating) 2 Gas Turbines x 01 Steam Turbine
(iv)	*Date of construction/operation commencement*	Construction activities commenced in July 2011. Project achieved Commercial Operation Date (COD) on April 4, 2014. after successful completion of Reliability Run Test on April 3, 2014
(v)	*Name, designation and signature of person responsible for preparing/reviewing the report*	Fida Muhammad Khan, Manager HSE Uch-II / Waseem Ellahi Plant General Manager
B	**Relevant Environmental Permits or Compliance Certificates**	
(i)	*Summary of permit conditions & media(s) covered*	"No Objection Certificate issued by BEPA"
(ii)	*Issue by which government Agency*	Baluchistan Environmental Protection Agency (BEPA)
(iii)	*Issuance date and duration of validity*	December 9, 2010 – BEPA also issued Confirmation of compliance under PEPA Regulation 2000 in April 2014. Copy of BEPA confirmation of compliance attached as Appendix-H.
(iv)	*Renewal requirements*	None
C	**Incidents of Violations or Non-Compliance**	
(i)	*Recorded date and responsible agencies*	None in Year 2014
(ii)	*Nature of non-compliance*	No reportable incident to authorities recorded during Year 2014.
(iii)	*Violation or non-compliance based on what environmental standards and regulations*	N/A
(iv)	*Recorded dates and authorities*	During Year 2014, EHS related observations of minor nature recorded during routine site monitoring. Log with corrective actions attached as Appendix A.
(v)	*Media or community reactions (if any)*	None in Year 2014
(vi)	*Corrective actions, deadlines, identification of responsible parties*	Short term corrective actions identified through regular site EHS walks. Please refer to Appendix A.
	(a) short--term: remedial action	Please refer to Appendix A
	(b) long-term: preventative measures	None in Year 2014
D	**Incidents of Environmental and Safety Accidents**	
(i)	*Incident recorded dates and responsible agencies,*	None in Year 2014
(ii)	*Scale of damage and injury (if any)*	None in Year 2014
(iii)	*Authorities in charge of investigation/recording*	Uch-II Management responsible for recording and investigation.
(iv)	*Media or community reactions (if any)*	None in Year 2014
(v)	*Corrective actions, deadlines, identification of responsible parties*	None in Year 2014
	(a) short--term: remedial action	None in Year 2014
	(b) long-term: preventative measures	None in Year 2014
E	**Labour Relations and Conditions**	
(i)	*Nature of labour dispute or grievance*	None in Year 2014
(ii)	*Legal requirements, Permit conditions and renewal requirements*	None in Year 2014
(iii)	*Authorities in charge of investigation/recording*	Uch-II Management responsible for recording and investigation.
(iv)	*Media or community reactions (if any)*	None in Year 2014
(v)	*Corrective actions, deadlines, identification*	N/A

	of responsible parties	
(vi)	*Labour relations and living conditions for construction labour force*	Large portion of construction labour camp decommissioned after completion of project phase and major chunk of EPC labour demobilized. Only warranty team is at site residing in dormitories with satisfactory living conditions.
F	**Environmental Capacity**	
(i)	*Staff capacities in environmental management (as relevant)*	Uch-II O&M Environmental Staff Consists of; (i) 01 Manager HSE (ii) 01 Deputy Manager Chemical (Effluent treatment, analysis & Spill Response) (iii) 01 Assistant Manager Chemical (Effluent treatment, analysis & Spill Response) (iv) 01 HSE Officer (v) 02 Senior Chemists (Effluent treatment, analysis & Spill Response) (vi) 01 HSE Coordinator (vii) 01 Chemical Assistants (Effluent treatment & Spill Response) • Dedicated total 08 Personnel • Organization structure of Uch-II O&M Environmental team is attached as Appendix-G.
(ii)	*Degree of awareness of: (i) environmental management, (ii) health and safety, (iii) environmental laws and regulations*	Project O&M phase H&S Management plan and all other Environmental applicable & relevant Laws and regulations orientation to O&M team carried out. Owner (Uch-II) project HSE department continues managing O&M phase. Very well updated on all the relevant HSE laws and regulations.
(iii)	*Training programs carried out*	• During the Year 2014 in-house training sessions on Manual Handling, High Noise Hazards & Control Technique, Work at Height Protection Measures, Confined Space Entry, Hazard Identification & Risk Assessment and Point of Work Risk Assessment carried out with O&M and Contractor staff. In addition to in-house trainings, following external safety trainings were outsourced and organized for O&M staff. - Basic Fire Fighting - Safe Operation of Fork Lift - Scaffolding Inspection - First Aid Refresher - OHSAS 18001 Internal Audit - IOSH Managing Safely. • Comprehensive classroom based HSE induction sessions conducted with contractor manpower during Uch-II planned outage in Year 2014. • Pre Job TBTs conducted on regular basis • Weekly Fire drills performed by O&M Team
(iv)	*Needs assessment of environmental management capacity (as relevant)*	All positions filled as per O&M staffing plan.
(v)	*Compliance audits carried out*	None in Year 2014
G	**Stakeholder Consultation/CSR Activities**	
(i)	*Details of consultations, if any, with local communities, nongovernmental organizations, civil society groups, and other stakeholders, including affected people*	None has been conducted Year 2014
(ii)	*Describe efforts to promote community relations and local development for inhabitants of the project area.*	No communities migrated or effected residing in the vicinity of project site due to facility setup. Uch-II is located within UPL boundary where UPL (owner of Uch-II) maintained a comprehensive CSR local community outreach and social development program since last many years. Main community development segments include; (i) Standardized primary education schools (ii) Modernized Emergency care centre (iii) 08 Drinking water treatment plants (iv) Internship and Trainee engineers program (v) Roads construction, calamity relief and free medical camps.
(iii)	*Project procedures for (a) hiring and (b) acquisition of goods and services*	UPL prefers hiring human resource from local area at all levels. Local – Balochistan O&M employees ratio 22%
(iv)	*Provide List of grievances and status of grievance resolution*	None in Year 2014.
H	**Issues, Status of Implementation of Mitigating Measures in the Environmental and Social Management Plan and Compliance with Environmental Qualities and Standards (national and international, as**	

	relevant) and Environmental and Social Requirements		
	Parameter	**Issue**	**Status**
1	*Air*	None	Gas Turbines Stack emissions monitored through CEMS. Air Emissions data (HRSGs stacks) for Year 2014 attached as Appendix-B. Results of ambient air quality and annual vehicle exhaust emissions testing are also provided in Appendix-B.
2	*Water (surface and ground water)*	None	Overall compliance with EMP (as applicable against specific parameters) in place. Attached is Appendix C, indicating water consumption data. Waste water generated is treated at water treatment plant and waste water treatment plant before disposal to evaporation pond. Appendix C indicates waste water qualitative and quantitative data for the period under review.
3	*Waste generation and management*	None	Solid waste managed through onsite land fill for Bio degradable and household waste. Recyclable waste provided to recycling contractor. Solid waste record indicated in Appendix-D for the period under review.
4	*Noise and vibration*	Plant high noise areas highlighted	Plant noise monitoring data (ambient & occupational noise levels) indicated in Appendix-E. Issue of high noise levels around plant equipment is also explained in Appendix-E.
5	*Occupational health and safety*	None	Monitoring of Health & Safety Key performance Indicators by Uch-II in place. Well-equipped UPL Site medical center with Medical officer and 02 nurses available 24/7 for medical treatment & emergencies. Annual medical surveillance program for UPL employees in place.
6	*Community safety and security*	None	Community safety during road travel is ensured through driver's awareness and training program. The non-local staff within the boundary wall of power plant sensitized for taking care of local norms and customs and avoiding unnecessary interaction with local community.
7	*CO_2 emissions by the Project*		CO_2 emissions data indicated in Appendix-B for Year 2014. Methodology for computation of the CO2 produced by the plant is also provided in the Appendix-B.
8	*Environmental and Social Management Plan, including IFC E&S Action Plan (September 29, 2010)*		Project H&S plan and EMP implementation and monitoring maintained throughout project phase. Attached Appendix-F summarizes the compliance status of mitigation measures for E&S plan for Operational Phase for Year 2014. (Ref Table 4-2 of EIA and Table 6-3 of EMP, both tables integrated into Appendix-F to avoid repetition of issues)
I	**Summary Assessment of Client Performance and Recommendations**		

Project Commercial Operation commenced on April 4, 2014 after completion of Reliability Run Test on April 3, 2014.
Total Power Generation during Year 2014 (Post COD period, April to December 2014) remained 2001.651 GWh.

Areas of concern:

- High noise around some plant equipment.
- Waste water treatment (RO Plant) commissioning in progress by EPC and not yet handed over to O&M. The issue has been taken up with EPC contractor as post COD major rectification items.
- Unavailability of guard rails around roof edges on some buildings at plant. The safety concern notified to EPC contractor and rectification work is underway.
- Safety concerns related to integrity of gratings and step ladders at water treatment area were reported. In this regard a comprehensive inspection survey was performed to identify the issues and findings were shared with EPC contractor for rectification. Corrective actions have been taken by EPC contractor.

Positive Achievements:

There were no employees or contractors LTI or medically treated injury recorded during the Year 2014. No environmental incident is reported in the period under review.

Uch-II successfully launched and implemented HSE learning web based software "Instinct Online HSE Training System". Several new initiatives like launch of Point of Work Risk Assessment Take-5, re-composition of HSE committee, installation of road safety sign boards completed in Year 2014.

Uch-II planned outage successfully completed without any Health & Safety and Environmental incident. Prior to start of outage, an outage safety plan was developed and risk assessments of all outage related tasks were critically reviewed to check their appropriateness. During the outage, regular safety walks and audits were performed and outage activities were closely monitored to ensure strict compliance of site HSE rules and procedures. Daily HSE meetings conducted with contractor's to discuss and address safety issues and observations. During the outage, gifts and awards were awarded to the contractor workers who demonstrated safe behaviors and strict compliance toward site safety and environmental rules.

HSE site monitoring walks and housekeeping inspections carried out as per plan. Firefighting equipment monthly inspections, regular housekeeping activities and fresh eyes observations carried out. No other significant Environmental & Social issues to report.

Acronyms

BEPA	Balochistan Environmental Protection Agency
CCR	Central Control Room
COD	Commercial Operation Date
CO_2	Carbon Dioxide
dB	Decibel
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
PEPA	Pakistan Environment Protection Agency
EPC	Engineering Procurement Construction
ESAP	Environment and Social Action Plan
E&S	Environmental and Social
GOB	Government of Balochistan
GOP	Government of Pakistan
GWh	Giga watt hours
HRSG	Heat Recovery Steam Generation
HSD	High Speed Diesel
HSE	Health Safety & Environment
H&S	Health and Safety
m^3	Cubic Meter
MSDS	Material Safety Data Sheet
MW	Mega Watt
NEQS	National Environment Quality Standards
NOC	No Objection Certificate
OGDCL	Oil and Gas Development Company Limited
O&M	Operation and Maintenance
pH	Hydrogen Ion Concentration
PPE	Personal Protective Equipment
PTW	Permit to Work
RA	Risk Assessment
RO	Reverse Osmosis
SOP	Standard Operating Procedure
SS	Sub Station (Electrical)
ST	Steam Turbine
TBT	Tool Box Talk
Uch-I	Uch Power Station
Uch-II	Uch-II Power (Private) Limited
WHO	World Health Organization

Appendix-A Uch-II Site Monitoring Summary FY-2014

Corrective Actions

Monitoring Period	**Q1, 2014**
Monitoring Conducted by	HSE Uch-II
Corrective Actions By	EPC Contractor

S. #	Findings	Corrective Actions	Compliance Status (as of April 03, 2014)
1	Heavy lift activity was in progress near CCR without barricading the area and workers found standing under the suspended load. • Unsafe act	Activity was stopped and lifting supervisor is advised to barricade the area and to conduct TBT with workers.	Completed
2	Poor standard of housekeeping was observed in the raw water treatment area where scaffolding tubes, planks and water drums were spotted scattered and creating the tripping hazards. • Housekeeping Issue	Issues addressed to the site HSE team to ensure proper cleaning of the area ad removal of waste material.	Completed
3	Un-inspected power grinder was being used by the EPC team at the top platform of lube oil console skid. • Un-inspected Equipment	Instructed the workers to get the grinder inspected before further use.	Completed
4	Concrete demolition activity was being carried out by the EPC workers inside the gas conditioning skid area without obtaining the Permit from PTW office. Workers spotted standing at the roof performing cutting activity without using any fall protection. • PTW non compliance • Non-compliance of work at height protocols	Activity was stopped. Work in charge was called on the spot and addressed the non-compliances. EPC site management is addressed to fully comply with PTW protocols.	Completed
5	At RO building area, front cover of a power distribution panel was found open creating the electrocution hazards for the workers working nearby. • Electrical Hazard	Informed to site HSE team and advised to check all panel boxes in the area.	Completed
6	Paint cans, wood and plastic materials were kept together near ST	Immediately removed the combustible materials from the area.	Completed

	transformer area creating fire hazard. • Unsafe Condition / Fire Hazard		
7	Cable termination activity was being performed by the EPC team inside the commissioned SS-14 building without obtaining the PTW. Risk assessment was not sufficient to cover all the hazards. • PTW noncompliance. • Non-compliance of PPEs	Hold the activity and instructed the job supervisor to obtain PTW for the job. Issue addressed to EPC site management to maintain strict PTW compliance all the time.	Completed
8	Un-protected cable trench near SS-14 station auxiliary transformer was spotted creating falling hazards for the workers working there.	Civil team informed to install guard rails around trench to avoid risk of fall.	Completed
9	A worker without mandatory PPE's / safety harness was spotted performing the welding job at car parking area of admin building. • Non-compliance of PPEs	TBT carried out with worker to realize the importance of use of PPEs.	Completed
10	Damaged / un-insulated welding cable was being utilized by the EPC team in car parking shed area for welding activity. • Electrical Hazard	Stopped the work and job supervisor is instructed to replace the damaged cable with healthy one before commencing the job again.	Completed
11	Improper storage of chemical drums spotted in the waste water treatment area near the dosing skid close to R O building. • Unsafe Condition	EPC HSE team informed to ensure the proper storage of chemical drums with availability of identification tags and MSDS.	Completed

Monitoring Period	**Q2, 2014**
Monitoring Conducted by	HSE Uch-II
Corrective Actions By	Uch-II Maintenance & Operation Departments

S. #	Findings	Corrective Actions	Compliance Status (as of June 30, 2014)
1	Concrete slabs placed over cable trenches were missing at three different locations around Gas Turbine-1 PEECC creating the falling into pits / trench hazards for the crew working nearby. • Unsafe Condition	Immediately barricaded the hazardous area and instructed the sub-contractor to place the concrete slabs over the cable trenches.	Completed
2	Dripping of water from air conditioning unit installed in workshop area was observed. Slipping and falling hazards generated due to presence of water. • Unsafe Condition	HVAC section routed the water drain line to drain. Caution signs of wet surface were displayed around the area as well before rectification of problem.	Completed
3	Un-attended scaffolding pipe installed at cooling water pump "A" inside the cooling water pumping station was creating the striking hazards for the workers working there. • Unsafe condition	Informed the mechanical department to remove the unattended scaffold pipe from the location. TBT was conducted with scaffolding crew regarding the complete removal of scaffolding items after completion of jobs.	Completed
4	Used and unused painting material like paint drum, brushes and thinner were found disorderly outside of admin building area while no work was being performed there. • Fire and chemical hazard	Instruction was passed to the painting sub-contractor regarding the hazards of paints and flammable liquids and for the keeping of material in the designated safe storage area.	Completed
5	Poor housekeeping observed at East side of GT-2 PEECC, where food waste items found disorderly and kept very close to Fire hydrant causing the obstacle for the operation of valve in case of emergency if occurs. • Housekeeping and Delay in emergency response time issues	Immediately instructed the cleaning crew to remove the food waste around the fire water hydrant. In the meantime instruction was passed to the fire department to look for the same hazardous condition at all plant fire hydrants and rectify the same.	Completed
6	A Sub-contractor was performing the Holiday test inside the Demineralized tank without having the Permit. PTW non-compliances	Immediately stopped the activity and informed the shift charge regarding the hazardous situation and later on instructed the activity supervisor to always ensure the arrangements of PTW before starting such activities.	Completed

7	Fire hydrant was being used for filling water drum which was kept by sub-contractor civil team. Drum was placed very close to the hydrant for grouting activity (Lighting pools foundation). • Unsafe act and condition • Delay in emergency response time	Immediately instructed the job supervisor to remove the drum from the area. Also, TBT was conducted with sub-contractor team regarding the unsafe acts and conditions.	Completed
8	Workers without mandatory PPEs (Safety Helmet) were observed performing the cleaning activity in plant operational area. • Non-compliance of PPEs	TBT conducted with the workers for the uses and benefits of wearing mandatory PPEs in plant operational area.	Completed
9	Poor housekeeping was observed inside the cooling water pumping station, where a lots of nut bolts which once used during the valves reinstatement activity found idly and creating the slipping, tripping and falling hazards. • Unsafe Condition	Instructed the mechanical maintenance department to relocate the idle nuts bolt to the designated storage area.	Completed

Monitoring Period	**Q3, 2014**
Monitoring Conducted by	HSE Uch-II
Corrective Actions By	Uch-II Maintenance & Operation Departments

S. #	Findings	Corrective Actions	Compliance Status (as of Sep 30, 2014)
1	Concrete slabs placed over cable trenches were missing at three different locations around Gas Turbine-1 PEECC creating the falling into pits / trench hazards for the crew working nearby. • Unsafe Condition	Immediately barricaded the hazardous area and instructed the sub-contractor to place the concrete slabs over the cable trenches.	Completed
2	Dripping of water from air conditioning unit installed in workshop area was observed. Slipping and falling hazards generated due to presence of water. • Unsafe Condition	HVAC section routed the water drain line to drain. Caution signs of wet surface were displayed around the area as well before rectification of problem.	Completed
3	Un-attended scaffolding pipe installed at cooling water pump "A" inside the cooling water pumping station was creating the striking hazards for the workers working there. • Unsafe condition	Informed the mechanical department to remove the unattended scaffold pipe from the location. TBT was conducted with scaffolding crew regarding the complete removal of scaffolding items after completion of jobs.	Completed
4	Used and unused painting material like paint drum, brushes and thinner were found disorderly outside of admin building area while no work was being performed there. • Fire and chemical hazard	Instruction was passed to the painting sub-contractor regarding the hazards of paints and flammable liquids and for the keeping of material in the designated safe storage area.	Completed
5	Poor housekeeping observed at East side of GT-2 PEECC, where food waste items found disorderly and kept very close to Fire hydrant causing the obstacle for the operation of valve in case of emergency if occurs. • Housekeeping and Delay in emergency response time issues	Immediately instructed the cleaning crew to remove the food waste around the fire water hydrant. In the meantime instruction was passed to the fire department to look for the same hazardous condition at all plant fire hydrants and rectify the same.	Completed
6	A Sub-contractor was performing the Holiday test inside the Demineralized tank without having the Permit. PTW non-compliances	Immediately stopped the activity and informed the shift charge regarding the hazardous situation and later on instructed the activity supervisor to always ensure the arrangements of PTW before starting such activities.	Completed

7	Fire hydrant was being used for filling water drum which was kept by sub-contractor civil team. Drum was placed very close to the hydrant for grouting activity (Lighting pools foundation). • Unsafe act and condition • Delay in emergency response time	Immediately instructed the job supervisor to remove the drum from the area. Also, TBT was conducted with sub-contractor team regarding the unsafe acts and conditions.	Completed
8	Workers without mandatory PPEs (Safety Helmet) were observed performing the cleaning activity in plant operational area. • Non-compliance of PPEs	TBT conducted with the workers for the uses and benefits of wearing mandatory PPEs in plant operational area.	Completed
9	Poor housekeeping was observed inside the cooling water pumping station, where a lots of nut bolts which once used during the valves reinstatement activity found idly and creating the slipping, tripping and falling hazards. • Unsafe Condition	Instructed the mechanical maintenance department to relocate the idle nuts bolt to the designated storage area.	Completed

Monitoring Period	**Q4, 2014**
Monitoring Conducted by	HSE Uch-II
Corrective Actions By	Uch-II Maintenance & Operation Departments

S. #	Findings	Corrective Actions	Compliance Status (as of Dec 31, 2014)
1	At raw water intake pump pit, a tube light rod found hanging and may fall down.	Tube light rod fixed properly.	Completed
2	Maintenance activity was being performed at GT-2 UAT. Insulating oil drum were found at job location without use of secondary containment.	Issue addressed to the maintenance team to use secondary containment to avoid land contamination in case of any leakage / spillage from drum.	Completed
3	Cleaning activity was being performed inside HRSG-2 main stack. No stand by man was deputed outside the entrance, while 02 workers were performing the cleaning activity inside the HRSG stack.	Issue brought in to the notice of maintenance supervisor for strict compliance. Further, a comprehensive training session on confined space entry protocols and duties of stand by man carried out with contractor staff.	Completed
4	Mishandling of gas cylinders were observed outside fuel gas skid where gas cylinders were found placed on the ground in horizontal condition.	Immediately informed to EPC contractor and instructed to secure the cylinder via chain in vertical position.	Completed
5	A plastic empty chemical drum was being utilized by workers as an elevated working platform.	Tool Box Talk performed with workers on the spot and further informed to EPC work supervisor for safety compliance.	Completed
6	Fire Hose reel box installed inside workshop building found blocked by the gas cylinder trolleys.	Relocation of cylinders carried out and access to hose reel box cleared.	Completed
7	No secondary containment found for chemicals placed inside maintenance workshop.	Drip trays beneath chemical drums provided.	Completed
8	A firefighting foam trolley placed in front of warehouse found leaked from its body.	Trolley replaced with new one.	Completed
9	General housekeeping and cleaning required at gas turbine, steam turbine, CW suction basin and HSD tank areas.	Housekeeping performed.	Completed
10	Near HRSG-1, an iron bar emerging from the concrete is causing tripping hazard.	Iron bar has been removed.	Completed

11	An open pit near Uch-II suction basin is found un-barricaded. The pit was excavated to rectify water leakage from an underground water pipe.	Hard and soft barrication around the pit carried out to avoid fall hazard	Completed
12	Blind corner at raw water pond turn (near clarifier). Convex mirror required to install at blind corners.	Convex mirror installed at the blind corner.	Completed
13	MSDS of chemical used for GT compressor cleaning is not available.	MSDS made available	Completed
14	Glass of canopy over fire exit at admin building is broken. It may cause accident by falling down. Glass needs to be replaced.	Glass replaced	Completed
15	At CCW pumps, cable trench concrete slab found missing which can cause the falling/tripping hazard.	Cover placed over the trench	Completed
16	Wild growth (bushes) found in 220KV switch yard and ST main step up transformer area.	Removal of bushes carried out	Completed
17	Chemical drums are placed near bund of HCL storage tank and not barricaded properly.	Drums barricaded with signage	Completed
18	Water leakage / dripping from deluge system of SS-14 transformer. Rectification of leakage required.	Leakage attended and rectified by maintenance team.	Completed
19	Continuous water dripping observed from Fire Hydrant (FH#5).	Leakage rectified by maintenance team	Completed
20	WTP area, wild growth inside sludge bed needs removal.	Wild growth removed	Completed

Appendix – B

Period: Year 2014 (Post COD)

GTs Stack Emissions

Fuel Type: Low BTU Gas

Q2, 2014

Stack Emissions	Units	Average GT-1	Average GT-2	Average Both GTs	Limits
Exhaust Temp.	°C	115.67	115.62	115.65	NEQS
Particulate Matter	mg/Nm3	6.83	2.79	4.82	500
SO2	mg/Nm3	6.27	6.08	6.17	400
SO2	Metric ton/d			0.21	100
NOX	mg/Nm3	53.07	50.6	51.83	400
NOX	lb/MMBTU			0.1	0.2

Q3, 2014

Stack Emissions	Units	Average GT-1	Average GT-2	Average Both GTs	Limits
Exhaust Temp.	°C	116.53	115.6	116	NEQS
Particulate Matter	mg/Nm3	24.12	1.08	12.6	500
SO2	mg/Nm3	1.23	12.61	6.92	400
SO2	Metric ton/d			0.08	100
NOX	mg/Nm3	46.03	41	43.51	400
NOX	lb/MMBTU			0.07	0.2

Q4, 2014

Stack Emissions	Units	Average GT-1	Average GT-2	Average Both GTs	Limits
Exhaust Temp.	°C	117.91	116.73	117.3	NEQS
Particulate Matter	mg/Nm3	24		24	500
SO2	mg/Nm3	3.5	7.73	5.61	400
SO2	Metric ton/d			0	100
NOX	mg/Nm3	60.81	60.33	60.57	400
NOX	lb/MMBTU			0.1	0.2

CO2 Produced

Q1, 2014 (Pre-COD)

	Unit	
Total Diesel (HSD) consumed at site	Liters	148,755
Equivalent Tons of CO2 Produced	Tons	394.20

Post COD

Q2, 2014

	Unit	Monthly Average	Total Quantity
CO2 Produced (including CO2 in fuel gas)	[Tons]	148,450.87	416,372.87
CO2 Produced (excluding CO2 in fuel gas)	[Tons]	83106.45	233,095.45

Q3, 2014

	Unit	Monthly Average	Total Quantity
CO2 Produced (including CO2 in fuel gas)	[Tons]	192,723	578,169
CO2 Produced (excluding CO2 in fuel gas)	[Tons]	108,251.66	324,755

Q4, 2014

	Unit	Monthly Average	Total Quantity
CO2 Produced (including CO2 in fuel gas)	[Tons]	61,586.46	184,759.37
CO2 Produced (excluding CO2 in fuel gas)	[Tons]	105,709.00	317,129.00

CO_2 Calculation Methodology

1.0 Monthly average Natural Gas quality data is obtained from Gas chromatograph indicating Natural gas constituents in %age.
2.0 Mole fraction of constituents is calculated and CO2 weight is obtained.
3.0 The monthly gas consumption data is obtained from flow computers available at gas station in MMBTU.

Typical monthly computation data is as follows;

Data from Gas Chromatograph			Manual Calculations					
Gas Constituents		Moles %	Molecular weight	Fraction of Gas Mole	Wt	Moles of CO_2 Generated	Wt of CO_2	
Carbon Dioxide	CO_2	36.00976667	44.0098	0.360098	15.847826	44	15.84430	
Nitrogen	N_2	20.44097333	28.01348	0.204410	5.726228	0	0.00000	
Methane	CH_4	41.68367	16.04276	0.416837	6.687211	44	18.34081	
Ethane	C_2H_6	1.11432	30.06964	0.011143	0.335072	88	0.98060	
Propane	C3H8	0.41803	44.09652	0.004180	0.184338	132	0.55180	
I-Butane	C4H10	0.11367	58.1234	0.001137	0.066069	176	0.20006	
N-Butane	C4H10	0.121	58.1234	0.001210	0.070329	176	0.21296	
I-Pentane	C5H12	0.03967	72.15028	0.000397	0.028620	220	0.08727	
N-Pentane	C5H12	0.0300	72.15028	0.000300	0.021645	220	0.06600	
Hexane	C6H14	0.0200	86.17716	0.000200	0.017235	264	0.05280	
Molar Total	----	100.0		0.9999	28.984573		36.3366	Incl CO_2 in gas
							20.4923	Excl CO_2 in gas

Heating values

Constituents	HHV (dry) MJ/kg	LHV (dry) MJ/kg	HHV (dry)	LHV (dry)	
Carbon Dioxide	0	0	0	0	
Nitrogen	0	0	0	0	
Methane	55.4850	49.9995	371.0400	334.3574	
Ethane	51.8645	47.4742	17.3783	15.9073	
Propane	50.3414	46.3418	9.2798	8.5426	
Isobutane	49.5135	45.7279	3.2713	3.0212	
N-Butane	49.5135	45.7279	3.4823	3.2160	
Isopentane	48.9996	45.3419	1.4024	1.2977	
N-Pentane	48.9996	45.3419	1.0606	0.9814	
Hexanes	48.6694	45.0907	0.8388	0.7772	
			407.7535	368.1007	MJ/mole of gas
			MJ/kg	MJ/kg	
			14.06795	12.69988	

For calculating CO_2 emissions the following formula is:

CO_2 Tons = Gas Consumed MJ / LCV (MJ/Kg) X Total wt of CO2
(Molecular wt of Gas Kg x 1000)

Whereas 01 MJ = 1055.056 x MMBTU

If we have consumed Natural Gas = 1,830,729.00 MMBTU than Natural Gas than Total CO_2 Generated including CO_2 in Gas will be 190,667.7481 Tons and 107,528.5354 Tons excluding CO_2 in gas.

Energy Usage (Post COD)

Parameters	Unit	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Fuel gas consumed	m^3	875,724,07.14	774,465,73.81	784,399,28.77	114,983,101.70	107,053,267.26	111,433,018.70	105,037,375.90	112,669,049	111,331,927.60
Hours of Operation	Hour	532.75	522.41	499.82	726.5	697.08	698.23	602.38	715.6	720.97

Ambient Air Quality Data – FY 2014

Parameters	Units	Monitoring Location				NEQS Limits
		Point # 1 Boundary Wall	**Point # 2 Boundary Wall**	**Point # 3 Boundary Wall**	**Point # 4 Boundary Wall**	
		24 Hours Average Concentration				
CO	mg/m^3	9.0	9.3	10.9	11.8	5 mg/m^3 (limit for 8 hours)
NO	$\mu g/m^3$	10.9	9.8	12.2	11.6	40 $\mu g/m^3$ (limit for 24 hours)
NO_2	$\mu g/m^3$	0.1	0.1	0.1	0.1	80 $\mu g/m^3$ (limit for 24 hours)
SO_2	$\mu g/m^3$	3.4	3.6	4.5	3.9	120 $\mu g/m^3$ (limit for 24 hours)

Annual Vehicle Exhaust Emissions – FY 2014

Parameter	Units	NEQS Limit	Vehicle #						
			CU-0636	**PVA-013**	**PVA-014**	**PVA-015**	**PVA-016**	**PVA-017**	**Forklift**
CO	%	06	0.01	0.03	0.02	0.02	0.05	0.01	0.02
Smoke	Ringlemann scale	02	01	02	02	03	02	01	02
Noise	dB (A)	85	72	77	77	77	68	72	75

Heavy Metals Emissions

Although the requirement of heavy metals emission monitoring is mentioned in Table 7-2 of the EMP and monitoring frequency is defined as annual, however, Continuous Emission Monitoring Systems (CEMS) installed for GTs stack emissions monitoring doesn't have the provision to monitor heavy metals.

Further, the plant is not designed to operate on liquid fuel containing heavy metals or contaminated fuel; therefore, expected emissions from stacks should not contain heavy metals.

However heavy metal emission monitoring will be sourced through 3rd party annual environmental testing.

Appendix-C

FY-2014

Cooling water

Location: Cooling tower discharge point

Parameters	Unit	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	NEQS Limits
Temp	°C	34.89	35.35	39.33	43.29	42.32	42.53	37.8	36.4	34	40
pH	pH	7.84 - 8.2	7.78 - 8.28	7.85 - 8.08	7.9 - 8.45	8.0 - 8.32	7.95 - 8.28	8.06 - 8.3	8.15 - 8.29	8.11 - 8.3	6 to 10

Sewage Treatment Plant

Location: Sewage treatment discharge point

Parameters	Unit	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	NEQS Limits
pH	pH	Sewage treatment plant under commissioning			7.98	8.1	3.5	7.5	7.26	7.66	6 to 10
TSS	mg/liter				10	10	8	11	10	12	150
BOD	mg/liter				11.3	8.2	9.2	6.6	8.3	16.1	80
COD	mg/liter				26	4.0	24	6.0	45	48	150

Process Water Treatment Plant

Location: Discharge

Parameters	Unit	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	NEQS Limits
pH	pH		10.35	10.0	9.9	9.74	9.74	9.9	9.87	9.87	6 to 10
TSS	mg/liter		3	2	2	1	1	2	1	1	150
Cl-	mg/liter		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1000
Metals (Fe)	mg/liter	Testing requirement on biannual basis						120 ppb			

Evaporation Pond

Pre-COD

Parameters	Unit	Jan-14	Feb-14	Mar-14	NEQS Limits
BOD	mg/liter	63	60	41	80
COD	mg/liter	115	90	121	150
pH	pH	8.2	7.7	7.9	6 to 10

Post COD

Location: Effluent flowing to evaporation pond

Parameters	Unit	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	NEQS Limits
BOD	mg/liter	27	22	20	12.5	15.3	11.6	12.9	10.3	14	80
COD	mg/liter	48	40	39	62	53	31	60	68	79	150
Cl-	mg/liter	449	426	435	478	558	482	501	455	458	1000
metals (Fe, Zn)	mg/liter	3.1, 0	3.0, 0	2.9, 0	2.7, 0	2.8, 0	3.0, 0	0.49, 0	0.28, 0	0.98, 0	Fe 8.0 & Zn 5.0
Temp	°C	29	29.5	32.4	33	30	27.8	26	21	20	40
pH	pH	8.8	8.9	8.65	8.06	8.14	8.24	8.49	8.24	8.1	6 to 10
TSS	mg/liter	24	19	22	15	26	7	28	10	23	150
Oil & grease	mg/liter	<10	<10	<10	1.9	1.4	1.5	1.2	1.4	1.6	10

Surface Drains

Location: Within 100m of turbines, WTP, Workshops /stores, oil water separator discharge

Parameters	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
Appearance & condition of oil & grease	No water in drains	No water in drains	No water in drains	No water in drains	No water in drains	No water in drains	No water in drains	No water in drains	No water in drains

Water Usage

Pre-COD

Location: Pat Feeder Canal intake point

Water usage	Unit	Jan-14	Feb-14	Mar-14
	(m3)	5,338	3,826	2,952

Post COD

Water usage	Unit	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
	(m3)	156,069	292,483	339,772	405,095	232,071	316,800	334,293	308,434	308,048

Appendix-D

Uch-II Waste Generation Statistics

Q1, 2014

Waste Type	Unit	Jan-14	Feb-14	Mar-14
Used oil	Liter	720	440	440
Metal	Tons	0.22	0.19	0.12
Paper/ Plastic/ Glass	Kg	45	25	28
Empty Cement Bags	Tons	0.9	0.8	0.6
Food Waste	Tons	2.4	1.7	1.3
Waste Water	m^3	3844	4176	4960
Oil Filters & Oily Rags	Kg	28	23	21
Used Batteries	Nos.	-	-	-
Old Tyres	Nos.	1	0	0

Q2, 2014

Waste Type	Unit	Apr-14	May-14	Jun-14
Used oil	Ltr	30	40	230
Metal	Tons	0.15	0.1	0.12
Paper/ Plastic/ Glass	Kg	135	80	65
Food Waste	Kg	145	132	105
Oil Filters & Oily Rags	Kg	40	24	22
Used Batteries	Nos	-	-	-
Old Tyres	Nos	0	0	0

Q3, 2014

Waste Type	Unit	Jul-14	Aug-14	Sep-14
Used oil	Ltr	33	51	30
Metal	Tons	_	0.2	0.16
Paper/ Plastic/ Glass	Kg	73	68	45
Wood & Food Waste	Kg	100	266	114
Oil Filters & Oily Rags	Kg	13	6	20
Used Batteries	Nos	0	0	0
Old Tyres	Nos	0	0	0

Q4, 2014

Waste Type	Unit	Oct-14	Nov-14	Dec-14
Used oil	Ltr	3200	40	130
Metal	Kg	95	21	10
Paper/ Plastic/ Glass	Kg	127	20	38
Wood & Food Waste	Kg	500	114	421
Oil Filters & Oily Rags	Kg	27	9	10
Used Batteries	Nos	0	0	6
Old Tyres	Nos	0	0	0

Appendix-E

Post COD

Occupational Noise Monitoring		Average Noise Monitoring Results (dB) A			
S. No	Noise Monitoring Location of Equipment	Guarantee limits	Q2-2014	Q3-2014	Q4-2014
1	East side of pump "A" at Raw Water Pumping Station	85 (dB) A	82.6	80.4	80.66
2	South Side of potable water supply pump "A"	85 (dB) A	77	71.6	73
3	South Side of CT Basin Makeup Pump "B"	85 (dB) A	86.1	82.6	82.73
4	West side of DM distilation pump "B"	85 (dB) A	79	_	_
5	South side of Hot Well make up pump "B"	85 (dB) A	81	_	_
6	East side of Service Water pump "A"	85 (dB) A	_	84.1	84
7	North Side of CT at ground level close to cell #02	85 (dB) A	84.1	84.3	85
8	North Side of CT at ground level close to cell #06	85 (dB) A	87	84.2	84.66
9	East Side of Cooling Tower fan motor # 6(10PAB01-AN006)	85 (dB) A	82.4	81.4	78.71
10	East Side of Fire water pump house (Door close & Diesel pump running)	85 (dB) A	86.1	_	73
11	East Side of Cooling Tower fan motor # 8 (10PAB01-AN008)	85 (dB) A	87	83.4	81.33
12	West side of HSD Decanting point # 3	85 (dB) A	65.1	61.3	63.56
13	North Side of HRSG-2 main stack	85 (dB) A	74.4	69.23	69.78
14	North side of GT -2 Generator	85 (dB) A	80.4	74	75.16
15	South side of GT -2 turbine combustion chamber	85 (dB) A	82.2	78.6	79.25
16	North side of GT -2 PEECC	85 (dB) A	72	66	69.63
17	South side of boiler feed pump "A"	85 (dB) A	_	83	81.9
18	South side of GT -1 PEECC	85 (dB) A	76.1	70	71.51
19	South side of GT -1 turbine combustion chamber	85 (dB) A	83.5	77.9	79.65
20	West side of GT -1 Generator	85 (dB) A	81.3	82.5	83.33
21	South side of GT -1 turbine compartment (shaft) entrance door	85 (dB) A	89.6	87	87.6
22	North Side of HRSG-1 main stack	85 (dB) A	76	68.5	72
23	West side of HRSG-1 at bottom close to HRSG duct entrance	85 (dB) A	86.2	83.2	85
24	West Side of Cooling water pumping station	85 (dB) A	83.1	77.2	81.2
25	West Side of CW pump "C" in cooling water pumping station	85 (dB) A	91 (pump B)	85	87.0
26	North Side of CW pump "C" in cooling water pumping station	85 (dB) A	90 (pump B)	85	86.0
27	West Side of Auxiliary CW pump # 2 in cooling water pumping station	85 (dB) A	_	86.1	88
28	East Side of Auxiliary CW pump # 2 in cooling water pumping station	85 (dB) A	_	87	85
29	North Side of CCW pump "A"	85 (dB) A	81.7 (PumpB)	77.3	_
30	North Side of instrument Air Compressor "B"	85 (dB) A	84 (Comp A)	83.2	81
31	North Side of Boiler Feed Pump # 2/B at HRSG-1 Bottom	85 (dB) A	86.5 (Pump1)	85	84.9
32	East side of Steam Turbine	85 (dB) A	81.5	84.7	85
33	West side of Oil cooler in lube oil console skid for STG	85 (dB) A	87.6	81.7	84.8
34	West side of Steam Turbine	85 (dB) A	80.5	86	87
35	Waste Water Treatment plant near pump station	85 (dB) A	57.5	60.5	66
36	North Side of workshop	85 (dB) A	64.2	58.5	54

High Noise Around Plant Equipment:

Higher noise levels pertains to BOP (Balance of Plant) equipment including cooling water pumps and auxiliary cooling water pumps etc. The matter of high noise has already been taken up with EPC Contractor. The high noise levels have not been accepted by owners and Currently the matter is taken up with EPC contractor for demonstrating noise levels acceptable as per contract and National Environmental Quality Standards. The matter is still unresolved and pending with EPC contractor. Mitigation measures like in house awareness and high noise signage posted on all areas. All employees have ear muffs and ear plugs available as basic personal protective equipment.

Ambient Noise Monitoring		Average Noise Monitoring Results (dB) A	
S. No	Noise Monitoring Locations	Guarantee limits	FY 2014
1	Colony west boundary wall	70 (dB) A	54.3
2	Colony north boundary wall	70 (dB) A	54.5
3	South boundary wall (near new security post)	70 (dB) A	52.5
4	North boundary wall (near new security post)	70 (dB) A	49.2
5	Main gate UPL	70 (dB) A	41.8
6	Qasim Post (at boundary wall)	70 (dB) A	45
7	Ghaznavi Post (at boundary wall)	70 (dB) A	39
8	Tariq Post (at boundary wall)	70 (dB) A	38.6
9	Mehfooz Post (at boundary wall)	70 (dB) A	41.5
10	Lalek Jan Post (at boundary wall)	70 (dB) A	51.4
11	John Mohan Post (at boundary wall)	70 (dB) A	62.2
12	Iqbal Post (at boundary wall)	70 (dB) A	56.7
13	Check Post # 14	70 (dB) A	55

Compliance Status of EMP Control Measures FY-2014

Appendix-F

Uch-II Project (Operational Phase)

Environmental / Social Impacts	Control & Mitigation Measures	Monitoring Frequency	Responsibility	Compliance Status
Air Emissions	- Stack emissions monitoring in place through CEMS (Continues Emission Monitoring System) - Annual third party stack emissions and ambient air quality testing - Monitoring compliance with National Environmental Quality Standards	- Monthly - Annually	Uch-II O&M team	Complied
Plant Noise	- Noisy equipment are placed inside the acoustic enclosure - Availability of silencers at intake and exhaust channels - Plant routine noise monitoring in place - High noise areas are identified and high noise signage displayed to enhance awareness	Monthly	Uch-II O&M team	Complied
Waste Water	- Uch-II is zero liquid discharge facility - Waste streams generated from plant (sanitary waste water, cooling tower blow down, demin regeneration waste water, oily waste water etc.) disposed off into onsite evaporation pond after required treatment - Waste water sampling, analysis and test record being maintained - Compliance monitoring and reporting in place	Daily	Uch-II O&M team	Complied
Water Sourcing	- Fresh surface water sourced from Pat Feeder Canal as per project design and irrigation permits from Government of Balochistan. - Water consumption monitoring on monthly basis - Water conservation – Reuse from waste Reverse osmosis Plant. (waste water plant not yet handed over to O&M by EPC)	Applicable after RO plant handover	Uch-II O&M team	After RO plant handover
Hazardous Materials	- Segregation of hazardous waste - Separate storage area for hazardous wastes - Hazardous waste disposal through waste contractor - Hazardous waste quantification on monthly basis and record being maintained - Regular inspection of storage areas	Monthly	Uch-II O&M team	Complied
Solid Waste Management	- Waste Management Procedure in place - Color coded waste bins available at different plant locations for different waste types - Designated land fill area for disposal of food / kitchen waste - Non Hazardous waste quantification on monthly basis and record being maintained	Monthly	Uch-II O&M team	Complied

Occupational Health and Safety				
Electrical Hazards	- Permit to work / Lock out Tag out procedure in place. All electrical isolations are ensured before performing any activity on energized systems - Access to high voltage areas (electrical substations, 220 KV switchyard, panel rooms etc.) is controlled - Electrical safety signage displayed in respective areas to enhance the risk awareness of staff	Ongoing on regular basis	Uch-II O&M team	Complied
Confined Space Entry	- Identification of all confined spaces at plant - Confined Space entry procedure in place covering all confined space associated risks and control measures - Regular confined space training sessions with staff - Training sessions on Responsibilities of Standby Man	Ongoing on regular basis	Uch-II O&M team	Complied
Machine Guarding	- Moving and rotating parts of plant equipment are properly guarded to eliminate the risk of entanglement and injury - Permit to work / Lock out Tag out procedure in place to ensure the safety of staff working in plant equipment - All kinds of plant and machinery inherent dangers to workers are mitigated through engineering controls and safety devices	Ongoing on regular basis	Uch-II O&M team	Complied
Eye Head and Foot Protection	- Mandatory and Job specific personal protective equipment are provided to all staff and contractors working at plant - A procedure for provision, use & maintenance of PPEs in place - Open toe shoes are not allowed inside the plant area - PPEs awareness signage displayed at prominent locations at plant - Regular monitoring of PPEs compliance - Contractors and visitors safety induction program in place	Ongoing on regular basis	Uch-II O&M team	Complied
Fire and Explosion Hazards	- Portable fire extinguishers are available throughout the plant area and buildings as per design layout and clearly identifiable - Inspection of fire extinguishers on monthly basis - Fire water system composed of fire water storage tanks, fire water pumps, fire water ring main (hydrants, monitors) available as per design and clearly marked - Emergency exits are well marked luminaries - Emergency response plan in place - No smoking policy in place	Ongoing on regular basis	Uch-II O&M team	Complied
Housekeeping	- Regular housekeeping drives program in place - Regular safety walks and housekeeping inspections - Lock out Tag out procedure in place	Ongoing on regular basis	Uch-II O&M team	Complied

Chemical Exposure	- Respirators are made available to staff works in chemical areas Regular inspection of work areas and storage areas to detect any leakages/ spillage - Safe movement of chemicals and fuels - Spill emergency response procedure	Ongoing on regular basis	Uch-II O&M team	Complied
Noise Levels	- Provision of ear defenders (ear muff, ear plugs) to staff - High noise safety signage displayed around noisy equipment to enhance awareness - Awareness session with workers on High Noise Risks and Control Measures	Ongoing on regular basis	Uch-II O&M team	Complied
Heat Related Stress / Illness	- Provision of cooling neck bands to employees, shaded rest areas for workers and cold drinking water facilities during summer season - Rest break system is ensured during works in hot weather - Heat Stress awareness session with staff	Ongoing on regular basis	Uch-II O&M team	Complied

Mitigation Measures – Photographs

Noise Signage at High Noise Equipment and Areas



Color Coded Waste Bins at different plant location



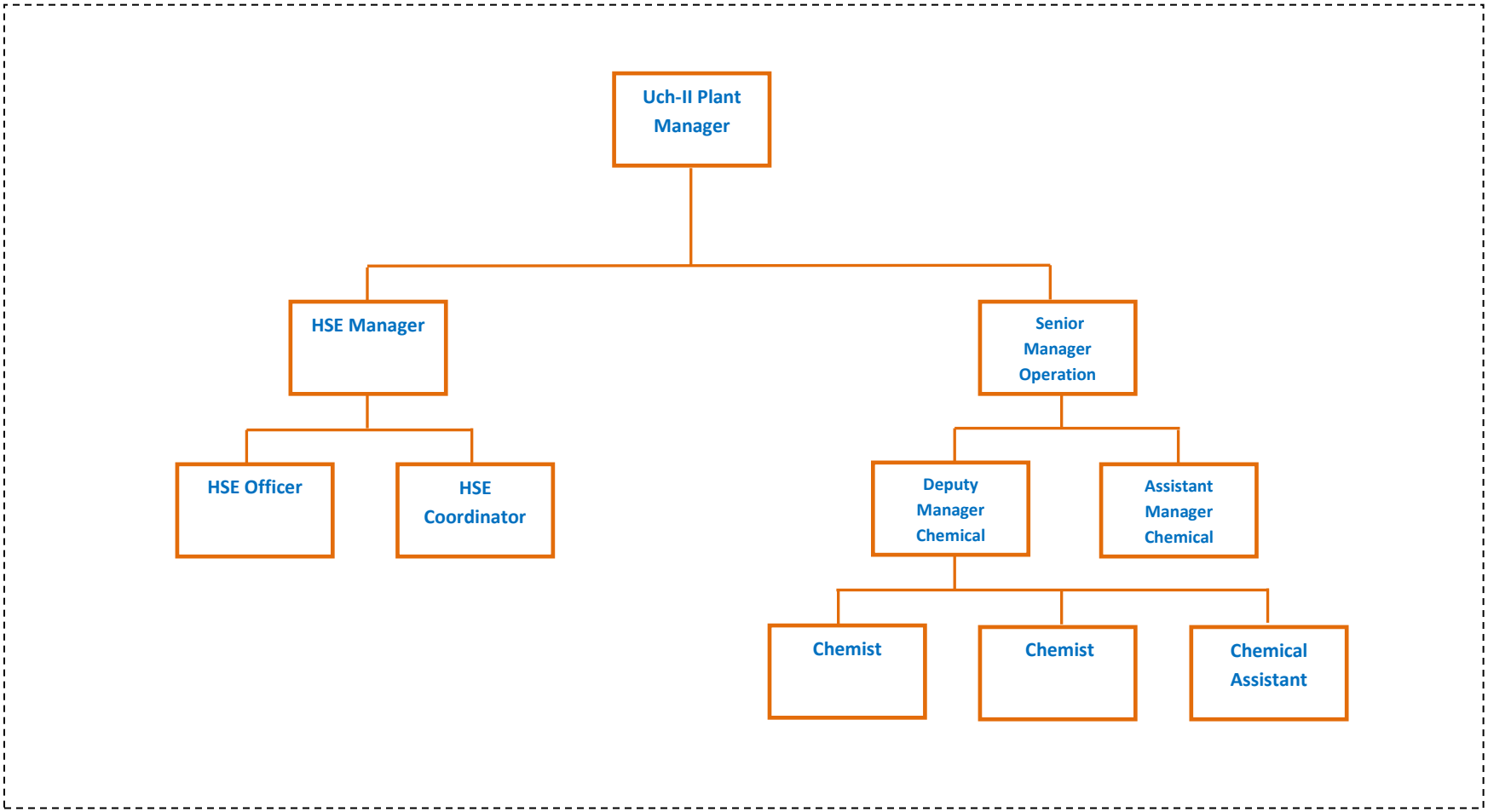
Safety Awareness Signage (PPEs, Housekeeping, Chemicals and Electrical Hazards)

Fire Equipment at Plant and Emergency Exits

Appendix-G

Uch-II (404 MW – ISO) CCGT Power Project

Uch-II Environmental Team - Organization Structure



Total Dedicated members	08

Appendix H

Attention: MR FIDA KHAN SB
M&S USE

OFFICE OF THE DIRECTOR GENERAL BALOCHISTAN
ENVIRONMENTAL PROTECTION AGENCY
GOVERNMENT OF BALOCHISTAN
SAMUNGLI ROAD QUETTA

Office: 081-9201840 Fax: 081-9201180 Email: epa_baluchistan@yahoo.com

No. DG (EPA)/ 4688 /2014 Dated: 22-04-/2014

To,

Mr. Babar Saeed Khan,
Construction Manager
48, Khayabar-e-Iqbal, Main Margalla Road
F-7/2 Islamabad-400 Pakistan
Tel: - +92512654901-4, Fax:-+92512654905

Subject;- **Request for Confirmation of Compliance under BEPA IEE/EIA Regulation 2000.**

With reference to your letter No.2.7.8/BEPA)/Corr dated 18th January, 2014 and to convey the approval of this Agency for the commencement of operation and commissioning of Combined Cycle subject to the conditions as already conveyed vide letter No. DG(EPA)/ 6269-72 dated 09-12-2010.

2. Furthermore, under section 14(1) of IEE/EIA Regulations,2000, the proponent is supposed to submit regular auditing and reporting in order to mitigate and manage the environmental impacts for the life of project.

(Naseer Khan Kashani)
Director General

Master file.

Incoming

Sent To:		PM, BS, FK, RI
Date Received		22-04-14
Mail Reg. No.		98 [AU
File No./Divider Name		
Doc. to be Archived		Yes ✓ No
Fax ✓	Doc.	Sealed
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From		

Apr. 22 2014 02:27PM P1 FAX NO. : 9202484 FROM : A