140. The overhead vapors of both evaporators are condensed in condensers and recovered condensate; which contains urea mist. CO_2 and Ammonia; is sent to Process Condensate treatment section.

d) Urea Prilling

141. The molten Urea solution after final concentration in vacuum section is fed to the Prilling bucket by means of a Urea Melt pump. The urea coming out from the rotating prill bucket encounters cold airflow in a natural draft Prilling tower, which causes its solidification. The product urea prills falling to the bottom of the Prilling tower are collected through a rotary scrapper and are sent to Bagging Plant / Silo.

e) Process Condensate Treatment

142. The process condensate containing small amount of CO_2, Ammonia and Urea coming out of vacuum condensers is collected in a buffer tank. The solution from this tank is fed to Process Condensate Stripper to strip ammonia and CO_2. The solution drawn from an intermediate tray of this column is sent to a Hydrolyser. In the Hydrolyser Urea is hydrolyzed to ammonia and carbon-dioxide. Hydrolyser vapors are recycled to the stripper for further stripping of ammonia & CO_2. The treated condensate, which is practically free of ammonia and urea, is sent to Offsite and Utility facility for use as Boiler Feed Water after polishing

2.8.4. Infrastructure & Utilities Required For CFG3 Project

2.8.4.1 Water

143. The total fresh water requirement for the proposed CFG - 3 expansion project is 554 m^3/hr. Water requirements for the existing plant are drawn from Kalisindh river, which is 6 Km away from the project site. Additional water requirement for this expansion project shall be tied up through following alternate sources:

(i) Installation of adequately sized Reverse Osmosis (RO) Unit based on overall water and effluent balances.

(ii) CFCL has got approval to draw 20 cusecs of water from Kali-Sindh river. With the installation of RO unit of suitable size to treat the effluents from CFG -3 and recycle back into system CFG-3 will not require drawl of any additional water (more than the sanctioned limit) from Kali-Sindh river. The balance fresh water requirement shall be met by augmenting the existing facilities on Kalisindh River. (Total drawl of water from Kali-Sindh River will not exceed the sanction limit of 20 cusecs).

Table 2.2 : The water consumption in the expansion project will be in the following areas:

Sr. No.	Purpose	Fresh Water Consumption (M^3 / hr)
1	Domestic	21
2	Cooling Tower	590
3	DM Plant (Boiler)	82
4	Service & Fire	55

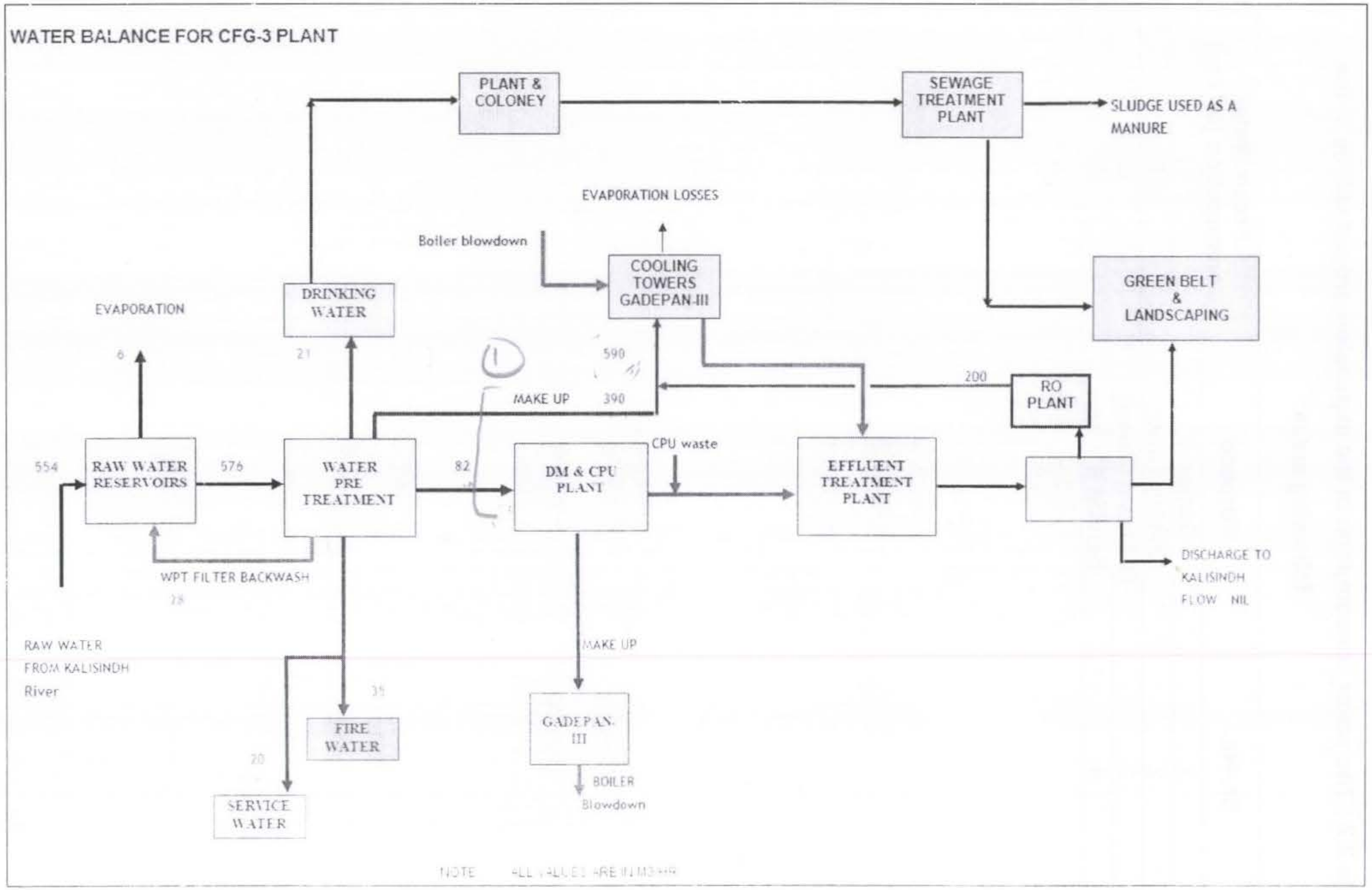

Figure 2.9 : Proposed Water Consumption in CFG 3

2.8.4.2 *Railway Siding*

(i) The existing Railway line coming from Bhonra Station on Kota-Bina section into the plant shall be catering to the need for CFG3 Project also. The siding facilities need not be augmented for dispatching additional 12 Million Ton Urea per annum.

(ii) No augmentation is envisaged.

2.8.4.3 *Cooling Water System*

(i) A single Cooling Tower of capacity 36000 m3/hr for new Ammonia and Urea Plants shall be provided along with cooling water treatment facilities. Cooling tower make-up shall be around 590 m^3/hr.

(ii) Blow down (92 m^3/hr) from the cooling tower shall be sent to ETP.

2.8.4.4 *Feedstock*

(i) Natural Gas/RLNG is the mandatory feedstock for fertilizer production. CFCL's existing plants at Gadepan are based on Natural Gas as feedstock. The site is thus ideally located for using Natural Gas as feedstock for CFG-3 also. Additional pipeline from Vijaipur to KOTA has sufficient margin for supply of Natural gas to the proposed CFG3 plant also.

(ii) No additional infrastructural facilities are envisaged for supply of gas to the expansion project.

(iii) Natural Gas / RLNG shall be available from GAIL / RIL. Action has been initiated for a firm commitment.

2.8.4.5 *Power*

(i) Power requirements for CFG3 shall be met by installing an 18 MW gas turbine generator with HRSG. The electrical receiving and distribution system will be augmented suitably.

2.8.4.6 *Effluent Treatment Facility*

(i) Existing effluent handling facilities shall be augmented to accommodate the additional effluent loads due to the expansion project. RO unit (of suitable capacity) will be installed to treat the 'treated effluents' for recycle back in the system.

2.8.4.7 *Ammonia Storage*

(i) No additional storage facility is envisaged for intermediate product ammonia. Existing Ammonia storage (2 x 5000 MT) shall be integrated for buffer stocking of product ammonia from expansion project on need base i.e. as and when down steam urea plant is out.

2.8.4.8 *Bagging plant*

(i) Suitable augmentation of existing bagging facilities shall be done to handle the additional production from CFG-3.

2.9. Environment Management (Existing & Proposed)

2.9.1. *Waste Water Management*

144. A fertiliser complex requires water for process use, steam generation, cooling tower make up, and domestic use. The CFG3 project activities shall not alter the use pattern except that there will be proportional increase in makeup water to DM plant and cooling towers and others as drinking water, service water & fire water etc.

145. Waste water is generated mainly due to regeneration of resins in DM plant, and blow down of cooling towers. These are the major industrial effluents; there are few more effluents as indicated in the effluent balance.

146. This entire effluent is treated to bring well within prescribed limits of RPCB / CPCB in steps in the effluent treatment facilities within CFCL complex. The treated effluent, well within permissible norms, is used for development of green belt within the factory & township. Only during monsoon a small portion of the treated effluent mainly rain water is discharged to the Kalisindh River as per RPCB guidelines.

147. The effluent is treated in "Neutralization Pit in DM plant, Oil Separator, Effluent Treatment Plant, Holding Pond and Sewerage treatment plant" as per the requirement.

148. The levels of pollutants present in the effluent shall be reduced to acceptable level by adopting the following waste water treatment steps:

- Adequate effluent treatment for removal of the pollutants and suspended solids.
- Neutralization & aeration of the waste water
- Mixing, settling, residence & recirculation
- Sewerage treatment in sewerage treatment plant.

2.9.2. *Waste Water Generation*

Industrial effluents

2.9.2.1 *Cooling tower blow down & back wash waste water*

149. The cooling tower blow down is directly taken to ETP settling chamber; where this mixes with other effluents. The effluent generated from back wash of side stream filters in cooling tower is also sent to ETP along with the cooling tower back wash.

2.9.2.2 *DM plant waste water*

150. In DM plant waste water is generated during regeneration of various ion-exchange resins. pH of these waste waters varies from acidic to alkaline, depending on the resin being regenerated. This waste water which also contains chlorides and sulphates is taken to neutralization pit in the DM plant for pH correction by mutual mixing along with air scouring. This neutralized waste water is then pumped to Effluent Treatment plant settling chamber.

2.9.2.3 *Oily waste water*

151. Waste water generated from compressor houses of Ammonia & Urea plant contains traces of oil & grease. The oily waste water is collected in a pit and is pumped to Oil Separator unit in ETP. Waste oil is

skimmed out from the oily waste water; this separated oil is collected in drums and disposed off to MoEF approved reusers. The oil free water is sent to ETP for mixing with other effluents.

2.9.2.4 Laboratory waste water

152. Small amount of waste water is generated from laboratory; this is sent to Neutralization Pit in DM plant and neutralized along with effluent from DM plant. This is sent to ETP after neutralization.

2.9.2.5 Urea plant floor washing waste water

153. In Urea plant waste water is generated due to floor washing of spillage/leakage. This waste water is collected in a pit in urea plant and is used for irrigation (green belt) purpose after mixing with treated effluents from holding pond.

2.9.2.6 Boiler blow down water

154. The blow down water from boiler is slightly alkaline and contains phosphate. This water is pumped to cooling tower and used as Cooling Tower makeup.

2.9.2.7 Waste water from Water Pre Treatment Plant

155. Water generated from clarifier is in slurry form mainly containing inorganic solids. Also waste water generated during back wash of sand filters contains solids. These are collected in a settling tank in WPT plant, mixed and allowed to settle; the clarified water is then pumped to Raw Water Reservoir for reuse. The sludge is used for green belts within the complex.

2.9.3. Effluent Treatment Plant

156. The effluent treatment plant comprises of Oil Removal system, pH correction system, waste water mixing & stabilization system, recirculation system. After treatment and attaining proper quality the treated effluent is pumped to holding pond.

157. **For CFG3 project it is proposed to augment the existing Effluent Treatment Plant by adding one more chamber to accommodate the additional effluent.**

2.9.4. Holding Pond

158. Treated effluent from ETP is pumped to holding pond. Here the effluent enters from one end of the pond and is contacted with air. Depending on requirement the effluent is kept under recirculation. This treated effluent conforming to norms is used for irrigation purpose in the green belt, lawns & gardens; in township & factory. Only during monsoon a small portion of the treated effluent is discharged to the Kalisindh River as per RPCB guidelines.

159. **However the effluent expected to be generated due to CFG3 project, is proposed to be treated in a RO unit. The treated water from RO unit shall be used as make up water for Cooling Towers. Thus no addition of water discharge to Kalisindh is expected.** CFG -3 plant will be **"Zero Discharge"** unit.

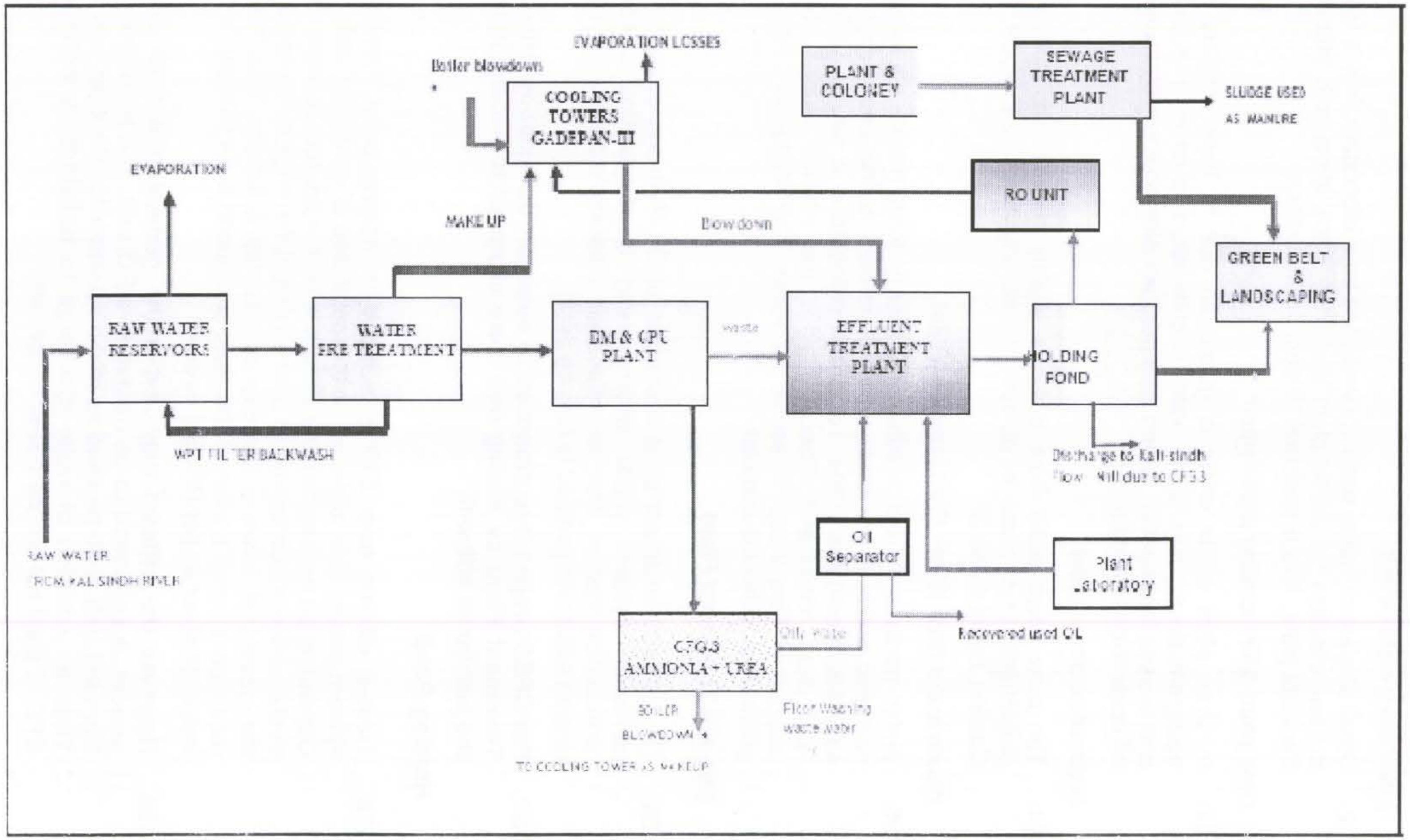

Figure 2.10 : Schematic Diagram of Water and Effluent

2.9.5. *Domestic effluents*

160. Domestic waste effluents are collected in pits in factory and township. These are then treated in existing Sewerage Treatment Plant (STP). The treated waste water is used for gardening and irrigation purpose in township and factory. The sludge is used as manure within the complex.

Details of expected effluents streams from CFG 3 are as given below:

Table 2.3 : Water water generated in CFG 3

Sr. No.	Expected Waste Water Quantities from CFG 3	
	Description	**Quantity (M^3/hr.)**
1	Cooling Tower Blow down	92
2	DM & CPU Regeneration Waste	22
3	Service Waste Water	6
4	Oily Waste water	2
5	Total Effluents from CFG 3	122
6	Domestic Waste Water to STP	6
7	Recycle back to RO	128

2.9.6. *Solid Waste Management*

161. During operation and maintenance minor solid wastes are generated in any process industry. An elaborate procedure has been prepared and followed at CFCL to handle wastes. The wastes have been categorised in two categories: Hazardous waste & Non-Hazardous waste.

162. The hazardous waste; spent catalyst, discarded containers and spent oil (liquid) are disposed as per RPCB guidelines to authorized agencies.

163. The Non-hazardous waste have been further categorised into combustible & non-combustible category.

164. The combustible bio-degradable solid waste generated from canteen, jute & cotton waste, STP sludge, paper waste etc. items like paper waste and cotton waste are sold to recyclers. STP waste and canteen waste are composted and used in gardens / green belts within the complex.

165. The combustible non-bio-degradable items such as PVC, HDPE, Rubber item scraps, used batteries are sold to recyclers. Batteries are disposed after proper neutralization & inspection.

166. Non-combustible solid waste are further categorised in to metallic & non-metallic categories. The metallic wastes from various sources are collected, segregated and sold to recyclers. The non-metallic waste such as sludge from WPT is used in gardens / green belts within the complex. Other solid waste such as construction demolition waste is used as landfill within the complex.

167. Waste from CFG3 shall also be managed as above. From RO system sludge will get generated which will be dried and disposed off suitable as per norms.

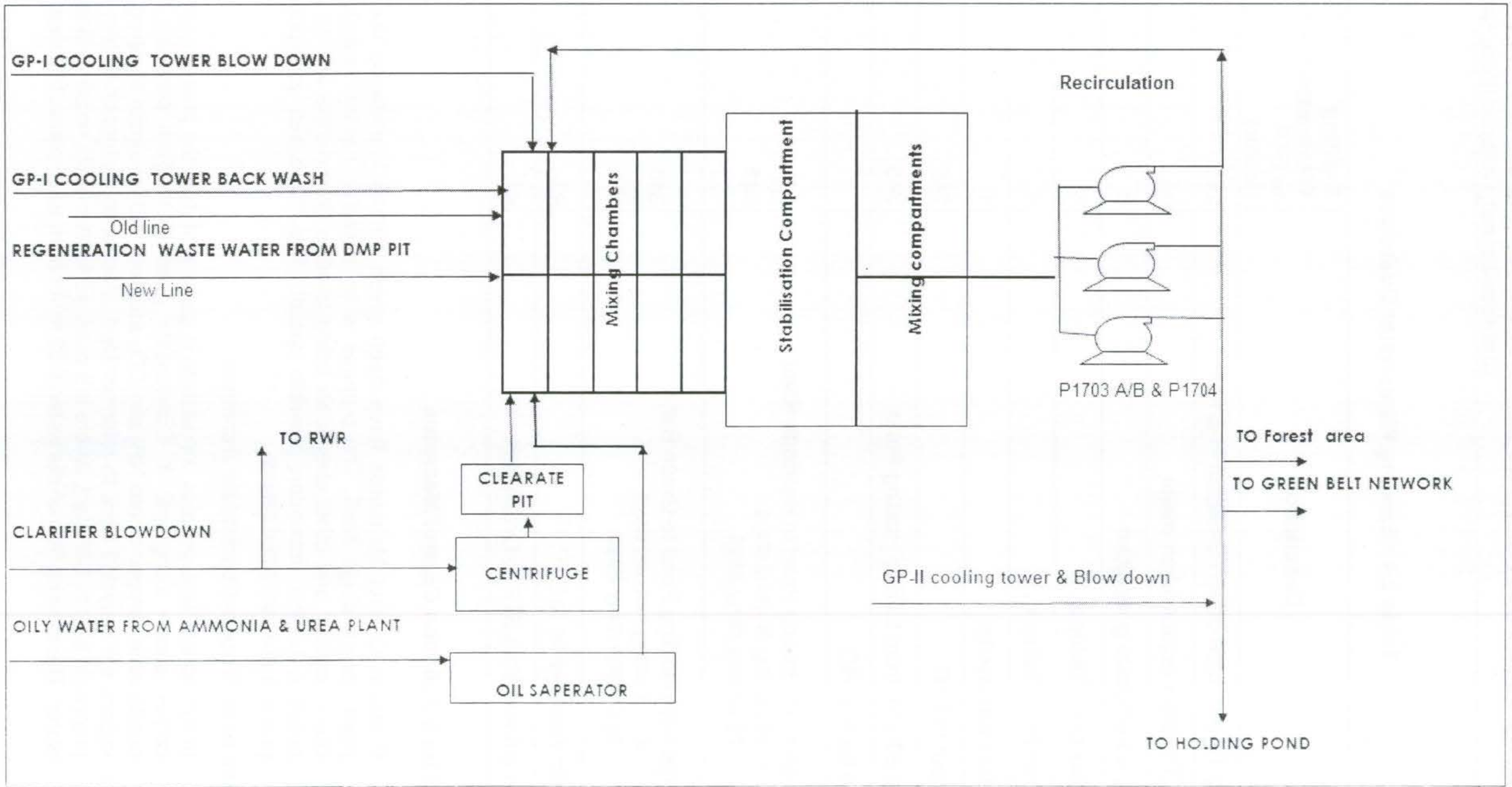

Figure 2.11 : Flow diagram of the Effluent Treatment Plant

Table 2.4 : Existing Wastewater Quantities

Description	Existing Wastewater to ETP (M3/hr)
Cooling Towers blow down (Gadepan –I & II)	256
DM & CPU plant regeneration waste	68
Service water waste generation	8
Oily water from Gadepan I	6
Oily water from Gadepan II	6
Laboratory wastewater	1
Total input to ETP	345
Treated effluent from ETP to Holding Pond	345
Recycle back to RO	
Discharge from Holding Pond to Kalisindh River a) During Normal days b) During rainy days	Nil 345
Discharge from Holding Pond to Green Belt a) During Normal days b) During rainy days	345 Nil
Domestic Wastewater to STP	41
Treated effluent from STP to Green Belt	41

2.9.7. *In-built Pollution Control Measures*

168. Pollution Control Measures have been given utmost importance during the plant design stage itself. The purpose is to conserve natural resources like water, energy and other chemicals being used in the process and to prevent pollution to the maximum possible extent. The measures incorporated in process are described below:

2.9.7.1 *Ammonia Process Condensate Treatment*

169. In Ammonia Plant, process condensate is generated from the process gas, which carries steam along with it. Condensate goes to medium pressure process condensate stripper where NH_3 and CO_2 are removed by steam stripping. These vapors are recycled back to reformer feed. Condensate stripper bottom purified product is sent to DM plant, where it is polished further for its reuse as Boiler Feed water. The existing flow of this water is 92 m^3/hr from each plant of Gadepan-I and

II. The expected flow of Ammonia process Condensate from CFG3 shall be 62 m^3/hr.

2.9.7.2 *Urea Process Condensate Treatment*

170. A liquid effluent treatment system is provided to recover ammonia by distillation of urea process condensate. Wastewater is purified in the distillation tower and the distillate ammonia is recycled to the urea process. A side stream of the distillation tower is taken to hydrolyser where the urea is thermally decomposed into NH3 and CO2. The overhead gases are recovered in absorbers and the hydrolyzed liquid from hydrolyser is recycled to the distillation tower. Purified water at distillation tower bottom is pumped to the DM plant for reuse as boiler feed water. The existing flow of this water is 85 m3/hr for Gadepan I and 75 m3/hr for Gadepan II. The expected flow of Urea process Condensate from CFG3 shall be 80 m3/hr.

2.9.7.3 *Boiler Blowdown*

171. Boilers blow-down is reused as cooling tower make up water. Due to its lower hardness, it helps in reduction in cooling towers blow down, thus savings treatment chemicals and water.

2.9.7.4 *Final Effluent Treatment in ETP*

172. The effluent treatment plant comprises of Oil removal system, Separation of Sludge, pH correction system, Wastewater mixing and Stabilization. The various effluent streams after treatment in ETP are taken into holding ponds

2.9.7.5 *Holding Pond*

173. The treated effluent is then transferred to Holding Pond. From holding pond it is used for development of green belt all around the factory & township as per requirements. During rainy season treated wastewater is discharged to river Kalisindh.

174. **Table 2.2** gives the quantities of effluent generated from various sources:

2.9.8. *Mode of Final Discharge of Treated Effluent*

2.9.8.1 *Irrigation System Design*

175. The treated wastewater meets the standards of irrigation water (IS 2490 - Part I) and is supplied to irrigation network comprising of 70km HDPE piping system spread over all around the factory and township. The treated wastewater is used for green belt development, demonstration farm, forestland, flower gardens and lawns.

2.9.8.2 *Point of Final Discharge*

176. During rainy season treated effluent from holding pond is discharged to river Kalisindh through 07km long HDPE pipeline with diffusers at the confluence point.

2.9.8.3 *Domestic Wastewater*

177. The domestic wastewater from the factory and township is treated in the existing STP. The treated effluent is used for irrigation (gardening). STP sludge, after drying in drying beds, is used as manure.

178. However the effluent expected to be generated due to CFG-3 project, is proposed to be treated in a RO unit. The treated water from RO unit shall be

used as make up water for Cooling Towers. Thus no addition of water discharge to Kalisindh is expected. CFG -3 plant will be "**Zero Discharge**" unit.

Table 2.5 : Characteristics of the existing treated effluent samples

Date:-Nov 08																		
S.No.	Location	PH	Cond.	Turbidity	TDS	TH as	Ca as	Mg as	Talk as	Cl	SO4	NO3 as	PO4	TAN	TSS	COD	BOD	O&G
				NTU		CaCO3	CaCO3	CaCO3	CaCO3	as Cl	as SO4	NO3	as P	as N	mg/l	mg/l	mg/l	mg/l
1	Holding pond	7.60	1956	4.2	1232	672	376	296	91	414	361	6.4	0.96	7.6	72	68.8	7.8	<1.0
2	ETP outlet	7.20	2159	4.9	1360	871	538	333	82	597	367	5.3	1.41	7.8	46	75.2	9.8	<1.0
3	STP outlet	7.40	746	3.2	470	273	168	105	182	120	95	3.9	0.88	2.8	34	32.5	8.6	<1.0
Date:-Dec 08																		
S.No.	Location	PH	Cond.	Turbidity	TDS	TH as	Ca as	Mg as	Talk as	Cl	SO4	NO3 as	PO4	TAN	TSS	COD	BOD	O&G
				NTU		CaCO3	CaCO3	CaCO3	CaCO3	as Cl	as SO4	NO3	as P	as N	mg/l	mg/l	mg/l	mg/l
1	Holding pond	7.50	1860	3.4	1172	706	421	285	94	431	384	7.2	1.02	8.5	78	64.6	8.2	<1.0
2	ETP outlet	7.00	2104	4.4	1326	735	431	304	72	530	372	6.8	1.48	9.2	58	78.4	8.8	<1.0
3	STP outlet	7.70	765	2.6	482	296	178	118	198	134	78	4.2	0.76	1.8	32	28.4	7.6	<1.0

Date:-Jan 09																		
S.No.	Location	PH	Cond.	Turbidity NTU	TDS	TH as CaCO3	Ca as CaCO3	Mg as CaCO3	Talk as CaCO3	Cl as Cl	SO4 as SO4	NO3 as NO3	PO4 as P	TAN as N	TSS mg/l	COD mg/l	BOD mg/l	O&G mg/l
1	Holding pond	7.80	1956	3.8	1232	690	398	292	84	398	352	7.8	1.16	8.2	72	69.8	8.8	<1.0
2	ETP outlet	7.10	2040	2.2	1285	850	482	368	78	588	392	7.2	1.52	10.2	54	72	8.2	<1.0
3	STP outlet	7.50	743	2.8	468	262	154	108	184	126	82	4.6	0.94	2.4	42	36.8	9.4	<1.0

2.9.9. Gaseous Emissions

179. Existing two plants of CFCL namely Gadepan – I and Gadepan – II have a number of stacks. Most of these stacks are for start up or safe shut down or catalyst reduction / activation etc. In the plant, the sources for gaseous emissions details are as below:

2.9.9.1 Stack Details

180. The details of various stacks are provided in **Table 2.6**

Table 2.6 : Existing & Proposed Project Stack Details

Plant	Stack attached to	Stack Height (m)	Stack Top Inside Diameter (m)
Ammonia - I	Adiabatic preconverter furnace stack	30	2.5
	Primary reformer flue stack (H- 204)	40	3.0
	Start up Heater Stack (H-501)	40	1.2
	Process condensate stripper stack (F-32)	30	0.8
	Ammonia storage stack	30	0.2
	Ammonia bearing gaseous stack	68	0.2
	Ammonia free gaseous stack	68	0.3
	CO2 Vent stack	55	0.5
Urea – I	Prilling tower (ME-6)	104	26.0
	First vent stack (ME-15)	108	0.25
	Second vent stack (ME-21)	108	0.25
	Blow down stack (ME-14)	108	0.75
Product Handling	Urea dust scrubber packing plant stack	30	1.0
	Urea dust scrubber screen house stack	34	1.0
Ammonia – II	Primary reformer flue stack	55	4.1
	Start up Heater Stack	30	1.4
	Flare gas stack	70	0.4
	Naphtha Flare stack	70	0.45
	CO2 Vent	71	0.4
	Auxiliary Boiler-III stack	36	2.5
	EDG-II stack	30	0.9
Urea – II	Prilling tower	118	26.0
	First vent stack	122	0.15
	Second vent stack	122	0.35
	CO2 vent silencers stack (2 nos.)	15	0.25

Offsites & Utilities	Auxiliary Boiler-I stack	30	2.0
	Auxiliary Boiler-II stack	30	2.0
	Heat recovery steam generator (HRSG) -I stack	30	3.0
	Heat recovery steam generator (HRSG) –II stack	30	3.0
	EDG-I Flue gas stack	19	0.45
Stack Details for Proposed CFG-3 Plant			
Ammonia Plant	Primary reformer flue stack (H- 204)	*40	4.1
	Heat recovery steam generator (HRSG+GT) – stack	*30	3.0
Urea-III	Prilling tower	120	26

* Stack heights shall as per EPA guide lines. However for modelling purpose the heights (minimum) have been taken as indicated above.

2.9.9.2 Flue Gas Characteristics

181. The details regarding characteristics of the various flue gases emitted from stacks are given in Table-2.7

Table 2.7 : Flue Gas Characteristics

Source	**NOx concentration in flue gas (ppm)**		
	25-11-08	**17-12-08**	**14-01-09**
Auxiliary Boiler-I	46	40.4	38.6
Auxiliary Boiler- II	28	41.2	39.8
Auxiliary Boiler- III	30	27.8	28.2
HRSG-I	28.4	28.4	29.2
HRSG-II	Not in Operation	Not in Operation	Not in Operation
Primary Reformer I	82	80	78
Primary Reformer II	76	78	74

Particulate Matter (PM) is not relevant to gaseous fuels. Sulfur as H_2S is normally < 10 ppm in Natural Gas

Table 2.8 : Emissions from Prilling Towers

Source	Particulate Matter (PM) in mg/Nm^3	Ammonia in mg/Nm^3
Existing Plants		
PT-I	42.8	20.6
PT- II	43.5	18.2
Bagging Plant Dedusting System	4.68	32.8
Proposed CFG-3 Plant		
PT-III	< 50	< 50

2.9.9.3 Plant Emission Load

182. The emission load from existing plant i.e. Gadepan I and Gadepan II and also from proposed expansion project CFG are given in **Table 2.7**

2.9.9.4 Fugitive Emissions

183. Fugitive emissions are also generated more specially while transporting and handling product urea. There are networks of suction hoods which sucks the dust leading to scrubber. The urea dust is dissolved and the urea solution formed is recycled back to the urea plant. The clean air is discharged to atmosphere. Similar fugitive dust control system (with latest technolgy) will be put up in CFG3 plant.

Table 2.9 : Emissions Load from Existing Plants and Expansion Project

Source	Plant Emission Load (kg/hr)			Remarks
	NO_X	PM	NH_3	
Existing Plant				
Primary Reformer (Gadepan I)	38.2			Vel.-12.1m/s; T-143^{0}C; NOx - 92 ppm
Primary Reformer (Gadepan II)	35.9			Vel.-7.6 m/s; T-144^{0}C; NOx - 74 ppm
Auxiliary Boiler - I	7.7			Vel.-11.12 m/s; T-105^{0}C; NOx – 41.7 ppm
Auxiliary Boiler – II	7.5			Vel.-10.96 m/s; T-104^{0}C; NOx – 40.6 ppm
Auxiliary Boiler – III	7.1			Vel.-10.74 m/s; T-137^{0}C; NOx – 27.5 ppm
HRSG - I	16			Vel.-18.5 m/s; T-193^{0}C; NOx – 28.4 ppm
PT – I		39.5	19	Vel.-0.57 m/s; T-49^{0}C; PM – 42.8mg/Nm^3; NH_3 20.6 mg/Nm^3
PT – II		45.8	18.6	Vel. 0.63 m/s; T-48^{0}C;

				PM – 43.5mg/Nm^3; NH_3 18.2 mg/Nm^3
Bagging Plant Dedusting System		0.13	0.92	Vel. 11.1 m/s; T-31^{0}C; PM – 4.68mg/Nm^3; NH_3 32.8 mg/Nm^3
Expansion Project CFG 3				
Primary Reformer	82.6 *59.1			Flow – 330, 384 Nm^3/hr NOx 250 mg/Nm^3 Nox-0.75 kg/ MT of Ammonia
GT / HRSG	74.6			Flow – 362,057 Nm^3/hr NOx- 100 ppm
PT		66 **68.5	66	Flow – 1,320,000 Nm^3/hr PM 50 mg/Nm^3; NH_3 50 mg/Nm^3 PM 0.5 kg/MT of urea

Note: * Load on mass basis- 0.5 kg / t of ammonia

** Load on mass basis- 0.5 kg / t of urea

2.9.10. Solid and Hazardous Wastes

184. The existing CFCL plants generates wastes both hazardous as well as non hazardous. Various waste materials generated in the plant are tabulated below.

Table 2.10 : Solid & Hazardous Wastes

Category	Generation from proposed activities	Generation from existing activities	Type of waste	Remarks/Disposal
Hazardous waste				
Used Oil	~ 5to 6 MTPA	10 to 12 MTPA	Recyclable	Sold to CPCB/SPCB approved recyclers
Spent Catalyst Copper based Cobalt based Nickel based	Expected : 30 ~ 150 MT in Five years	30 ~ 300 MT in Five years	Recyclable	Sold to CPCB/SPCB approved recyclers

Discarded containers of hazardous chemicals	Expected 100 nos / Year	500 nos / Year	Land disposal	Sent to TSDF site , Udaipur for land disposal
Solid Waste				
Water pre-treatment clarifier sludge	Expected ~ 10 to 12 MT/ Year	38 MT / year	Land disposal	Used as manure in horticulture
From Sewage plant	Expected ~ 1 MT year	4 MT year	Land disposal	Used as manure in horticulture

185. Solid waste generation from CFG III will be of similar nature except the sludge generated from RO unit. Sludge generated from RO system will be dried and suitably disposed off as per norms. Other solid wastes will be disposed off as per existing practice.

2.9.11. Noise

186. CFCL plant is having various machines and equipment such as compressors, turbine, DG sets, pumps, boiler that generate noise. Noise survey of the plant was carried out near the machines as well as at plant boundary and the data is presented in **Table-2.11** Noise level near the boundary (inside) is well within the norms as prescribed for residential area. Personnel working in the high noisy area have been provided with earplug.

Table 2.11 : Noise Survey of the Plant

Location	Day			Remarks
	26-11-08	23-12-08	16-01-09	
Amm. I Comp. House	81.5	81.1	81.2	1.5 m from Machine (Project Site)
Amm.II Comp. House	81.2	83.5	82.8	1.5 m from Machine (Project Site)
CT House (near Turbine)	75.0	82.3	79.8	1.5 m from Machine Project Site
Outside the CT House	49.8	57.4	56.8	Near Periphery
Main Security Gate	49.4	45.5	46.2	Near Periphery
Holding Pond Area	45.0	44.5	45.8	Near Periphery

187. The expansion project will have various machines and equipments which will generate noise. The equipments and machines will have adequate provision to minimize the noise generation. The noise generated from these will be addition to the existing system. As per existing practice personnel working in the high noisy area will be provided with earplug.

2.10. CORPORATE SOCIAL RESPONSIBILITY

2.10.1. Uttam Bandhan

188. To establish a closer brand and to provide personalized services to farmers, Chambal Fertilisers has started the 'Uttam Bandhan' programme, a community

welfare initiative. Crop and product demonstrations, field demonstrations and farmer meets are conducted. Farmers are given ongoing training on specialized services that vary from crop diversification, Animal Health Care, need for balanced inputs and use of bio-fertilisers. Soil & water sampling and testing are also conducted for free. To excite the new age farmer, a website www.uttamkrishi.com provides information on the weather, suitable cropping techniques and markets. It is an endeavor to help improve farm productivity by providing online information on various agriculture practices. Farmers can access the website at the 'Uttam Krishi Clinics' set up by the Company and at Agriculture Universities, Agriculture Research Stations and Krishi Vigyan Kendras. Chambal has set up 'Hello Uttam' Call Centers where agriculture experts respond to farmer queries on the phone.

189. Chambal has engaged bright, unemployed youth from village as 'Uttam Krishi Sewaks'. They are trained in the latest agricultural techniques and provide specialized services to farmers. They are self - employed and earn from commission on the sale of specialized products.

2.10.2. Rain Water Harvesting

190. CFCL is developing rain water harvesting system at various places in phases. 'CFCL engaged 'Water Resource Development Training Centre, IIT, and Roorkee' for study and preparing a report on 'Planning of Rainwater Harvesting in CFCL Campus, Kota.'. Based on their study consultant, have identified 13 places [seven in residential area, five in plant area and one outside the campus] for rain water harvesting. CFCL is taking follow up action in phases for developing rain water harvesting structures.

3. BASELINE ENVIRONMENTAL CONDITIONS

3.1. Prelude

191. The anthropogenic activities specifically related to industrial sector are expected to cause impacts on environmental quality in and around the project location. However, the intensity of environmental impacts from a specific project depends on several factors such as type of process (Physical, chemical, fuel combustion etc.) involved in the project, processing capacity (scale/size of the project), type and extent of pollution control measures, project location, surrounding geomorphology etc. To assess environmental impacts from proposed project at a specific location, it is essential to monitor the environmental quality prevailing in the surrounding area prior to implementation of the proposed project. The environmental status within the study zone is used for identification of significant environmental issues to be addressed in the impact assessment study.

192. The impacts from an existing industrial project on its surrounding environment are mainly regulated by the nature of pollutants, their quantities discharged to the environment, existing environmental quality, assimilative capacity of the surrounding environment and topography and terrain of the project site (its location) as well as the surrounding area.

193. In order to identify and establish the extent of likely impacts, it is essential to assess existing environmental parameters with regard to various components of the environment namely:

Physical Environment

- Topography and Physiography
- Climatology and Meteorology
- Air Environment
- Noise Environment
- Water Environment
- Soils
- Land Use Pattern

Biological Environment

- Terrestrial Ecology
- Terrestrial Wild Life
- Aquatic Ecology

Socio – Economic Environment

194. This chapter will briefly describe the base line environmental conditions as existed before the proposed expansion project.

3.2. Physiography and Topography

195. CFCL plant is located in the state of Rajasthan. Rajasthan stretches into two of India's major physiographic divisions, namely the Great Plains and the central

highlands. The area lying to the west of Aravallis i.e. western sandy plains, constitute the western part of the Great plains, while the area east of Aravallis falls in the northern part of the central highlands. Both of these major divisions in Rajasthan are marked by a variety of physiographic and relief features. Nearly 40 % of the area located primarily in the Jaisalmer, Barmer, Jodhpur, Bikaner and Churu districts has variable coverage of dunes. The dunes area of various types, amongst which longitudinal and coalesced parabolic type dominates. Rest of the area both to the east as well as the west of the Aravallis is dominated by Quaternary alluvial plains and buried pediments. The continuity of these plains is interrupted by hills and sheet rock exposures.

196. The lithological units that constitute the Kota Division are mainly those of upper Vindhyan System. Wide areas on the North are covered by the Upper Bhandar sandstone and parts of southern sector are mantled by Deccan trap flows. The eastern parts of the central belt is occupied by the Suket Shales, while on the west there are rock out crops of Kaimur sandstone. Alluvium covers part of the area on the north eastern parts. The following is the geological succession in order of antiquity:

197. Strata graphic successive of rocks, exposed in the Districts

- *Recent-* Alluvium rocks, Kankar
- *Recent to Sub- Recent-* Late rites, bauxite
- Upper Cretaceous to Lower Deccan traps
- Paleozoic (a) Upper Vindhyan Bhandar series, Rewa series kaimur series
- (b) Lower Vindhyan, Samuri Series

198. The land surface has a gentle slope from South to North. The main rivers in the district are Chambal and its tributaries, Kalisindh, Paravan, Ujhar, Parvati etc. The Hadoti region of which Kota district is a part, has sheet rock, as well as rich alluvial soils drained by seasonal rivers. The accelerated pace of siltation of river beds and reservoirs is causing extensive damage to irrigation as well as to agricultural production system. The area requires immediate action to protect the land and water resources. The ecosystem is facing a problem of siltation also because of heavy soil erosion due to lack of adequate vegetation cover in the higher hilly areas of the Vindhyas.

3.3. Climatology and Meteorology

199. Meteorology plays vital role in affecting the dispersion of pollutants into the environment after their discharge into the atmosphere. Rajasthan climate greatly varies according to the variation in the topography of the region. As Rajasthan has the Thar desert on its western part, the area is much drier and infertile. This part of Rajasthan has tropical or sub-tropical desert type of climate. But the south eastern part of Rajasthan is much wetter, hilly and more fertile. The landlocked state is devoid of moderating influence of the sea. The regions climate can be divided in four seasons: Pre-Monsoons, Monsoon, Post-Monsoon and Winter.

200. **Pre-monsoon,** or summer which extends from April to June, is the hottest one, with temperatures soaring to 45°C and above in some places. The highest temperature recorded at IMD centre Kota 47.8°C in the months of June and lowest 9.7°C January. The desert regions experience noticeable dip in temperatures at night. There are dust storms as well.

201. **Monsoon:** The second season Monsoon or the rainy season continues from July to September here the temperature drops but high level of humidity makes the days very comfortable.

202. **The Post-monsoon** period extends from October to November. The average maximum temperature recorded is 33°C to 38°C, and the minimum is between 18°C and 20°C.

203. **Winter:** The fourth season is the winter or cold season, which extends from January to March. January is the coolest month here. Temperatures sometimes falls below 0°C in some cities of Rajasthan, like Churu. There are light rains in the north and north-eastern parts of Rajasthan at this time.

204. A metrological station was set up inside the plant and temperature, wind velocity and direction, humidity and rainfall were recorded for the winter season (three months). No rainfall was recorded during the season. The data summary is given below

Table 3.1 : Meteorological Data (Winter Season)

Sr. No	Parameter	Highest	Lowest	Mean
	November, 08			
1	Temperature (^{0}C): Maximum Minimum	 40 24	 19 11	 32 14
2	Relative Humidity %	95	46	72
3	Wind Speed (kmph)	5.8	0.0	0.683
	December, 08			
4	Temperature (^{0}C): Maximum Minimum	 33 23	 18 8	 29 12
4	Relative Humidity %	94	62	81
5	Wind Speed (kmph)	5.9	0.0	0.63
	January, 09			
6	Temperature (^{0}C): Maximum Minimum	 32 20	 15 7	 36 11
7	Relative Humidity %	89	57	80
8	Wind Speed (kmph)	5.9	0.0	0.68

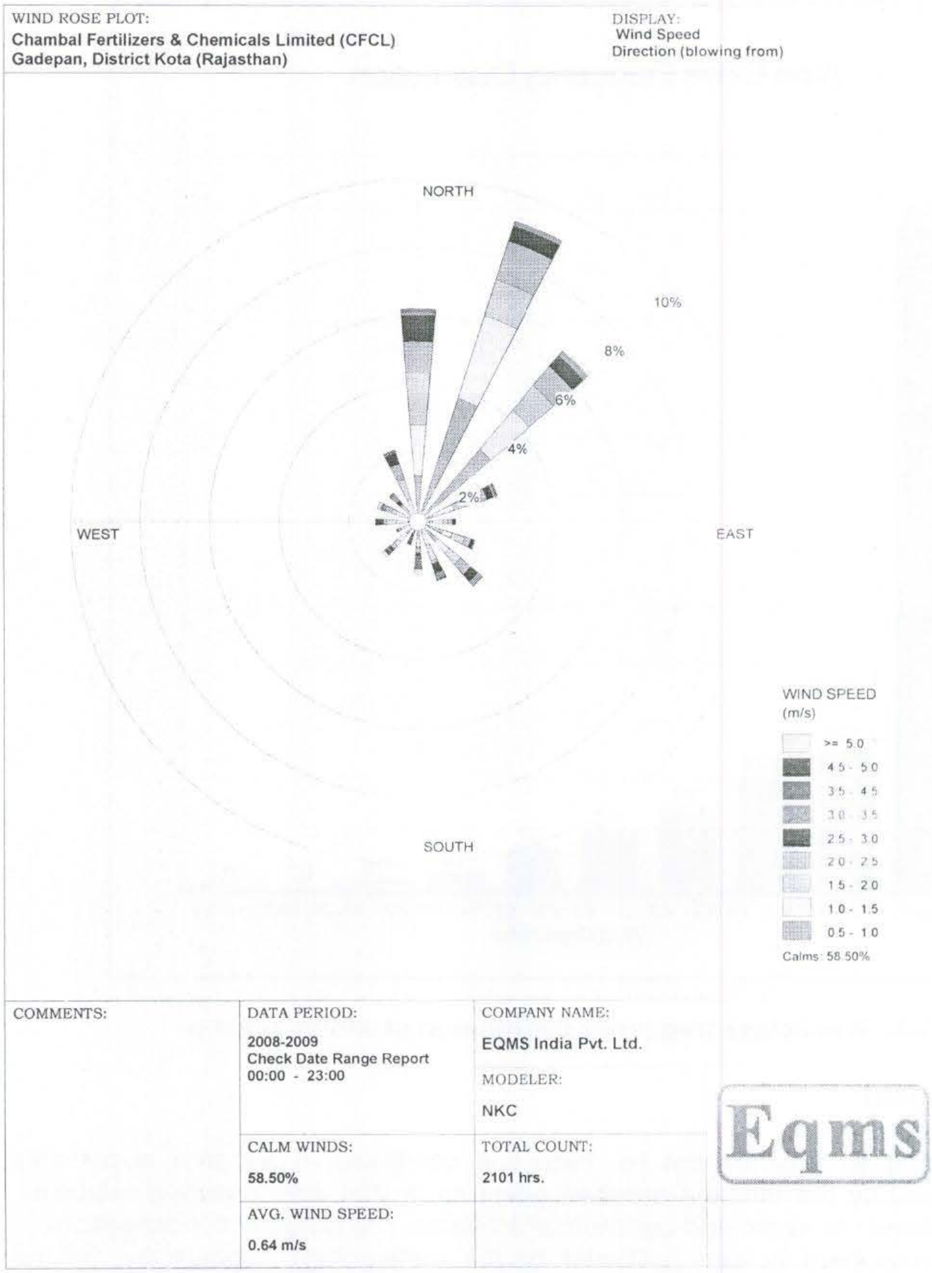

Figure 3.1 : Wind rose pattern in the winter season

205. **Figure 3.1** wind rose pattern as recorded in the winter season. Average wind speed recorded was 0.64 m/sec and calm period was for ~58% of the time.