

**PROPOSED EXPANSION OF  
AMMONIA & UREA PLANT  
WITH REQUIRED UTILITY FACILITIES  
AT  
GADEPAN  
DISTRICT KOTA (RAJASTHAN)**

**Submitted to:  
Chambal Fertilisers & Chemicals Limited**

**January 2010**

**Prepared by:**

**Eqms**

**EQMS India Pvt. Ltd.**

304 & 305, Rishabh Corporate Tower, Plot No. 16,  
Community Centre, Karkardooma, Delhi - 110092  
Phone: 011-30003200 - 30003218; Fax: 011 - 22374662  
Email: eqms@eqmsindia.org; URL: www.eqmsindia.com

**Final EIA/EMP Report**

## TABLE OF CONTENT

### Chapters

|   |      |
|---|------|
| Abbreviation .....                                      | x    |
| Executive Summary .....                                 | I    |
| Project Highlight .....                                 | I    |
| Pollutants Generation, Treatment and Disposal.....      | I    |
| Gaseous Emissions .....                                 | I    |
| Liquid Effluents .....                                  | II   |
| Solid Waste.....  | II   |
| Environmental Status of Plant Site and Study Area ..... | III  |
| Site Characteristics .....                              | III  |
| Soil.....   | III  |
| Water Resources and Water Quality .....                 | III  |
| Meteorology .....                                       | IV   |
| Air Quality .....                                       | IV   |
| Noise.....  | IV   |
| Environmental Impact Assessment.....                    | IV   |
| Topography and Soils .....                              | IV   |
| Air Quality .....                                       | IV   |
| Noise.....  | V    |
| Water Resources and Water Quality .....                 | VI   |
| Water Resources .....                                   | VI   |
| Water Quality .....                                     | VI   |
| Climatology and Meteorology.....                        | VI   |
| Land Use .....  | VI   |
| Biological Environment.....                             | VII  |
| Demographic and Socio-economic.....                     | VII  |
| Risk Assessment.....                                    | VII  |
| Disaster Management Plan .....                          | VII  |
| Environmental Management Plan.....                      | VII  |
| Air Environment .....                                   | VII  |
| Water Environment .....                                 | VIII |
| Climatology and Meteorology.....                        | VIII |
| Green Belt.....   | IX   |
| Environment Monitoring Plan.....                        | IX   |

|   |      |
|---|------|
| Conclusion.....   | IX   |
| 1. Introduction.....  | 1-1  |
| 1.1. Importance and Need of an EIA.....                               | 1-1  |
| 1.2. Project & Project Proponent.....                                 | 1-1  |
| 1.3. Project Site and Regulatory Compliance Status.....               | 1-3  |
| 1.4. Objectives of the EIA Study.....                                 | 1-4  |
| 1.4.1. Terms of Reference.....  | 1-5  |
| 1.4.2. TOR Compliance Status.....                                     | 1-6  |
| 2. Project Description.....   | 2-1  |
| 2.1. Introduction.....  | 2-1  |
| 2.2. Project Execution – Gadepan- I.....                              | 2-1  |
| 2.2.1. Manufacturing Process of Gadepan-I Plants.....                 | 2-2  |
| 2.2.2. Urea – I.....  | 2-5  |
| 2.3. Project Execution – Gadepan- II.....                             | 2-8  |
| 2.3.1. Manufacturing Process of Gadepan-II Plants.....                | 2-9  |
| 2.3.2. Urea-II Plant.....   | 2-12 |
| 2.4. Utilities and Off Site Facilities.....                           | 2-17 |
| 2.4.1. Gadepan-I.....   | 2-17 |
| 2.4.2. Gadepan-II.....  | 2-17 |
| 2.5. Existing Infrastructure.....                                     | 2-18 |
| 2.5.1. Railway Siding.....  | 2-18 |
| 2.5.2. Raw Water.....   | 2-18 |
| 2.5.3. Transportation.....  | 2-18 |
| 2.5.4. Ammonia Storage.....   | 2-18 |
| 2.5.5. Urea Storage.....  | 2-18 |
| 2.5.6. Naphtha Storage.....   | 2-18 |
| 2.5.7. Fire Fighting Facilities.....                                  | 2-19 |
| 2.5.8. Other Facilities.....  | 2-19 |
| 2.5.9. Effluent Disposal.....   | 2-19 |
| 2.5.10. Water Management.....   | 2-19 |
| 2.5.11. Storages of Important Chemicals and Fuels.....                | 2-21 |
| 2.6. Proposed Expansion Project - CFG 3 to manufacture 'Urea'.....    | 2-21 |
| 2.7. Location.....  | 2-23 |
| 2.7.1. Study Area Features.....                                       | 2-23 |
| 2.8. Manufacturing Process for Proposed Expansion Project (CFG3)..... | 2-23 |

|         |   |      |
|---------|---|------|
| 2.8.1.  | Process Description.....                                  | 2-23 |
| 2.8.2.  | Ammonia Manufacturing Process .....                       | 2-24 |
| 2.8.3.  | Urea Manufacturing Process: .....                         | 2-27 |
| 2.8.4.  | Infrastructure & Utilities Required For CFG3 Project..... | 2-29 |
| 2.9.    | Environment Management (Existing & Proposed) .....        | 2-32 |
| 2.9.1.  | Waste Water Management .....                              | 2-32 |
| 2.9.2.  | Waste Water Generation .....                              | 2-33 |
| 2.9.3.  | Effluent Treatment Plant.....                             | 2-34 |
| 2.9.4.  | Holding Pond.....   | 2-34 |
| 2.9.5.  | Domestic effluents .....                                  | 2-36 |
| 2.9.6.  | Solid Waste Management.....                               | 2-36 |
| 2.9.7.  | In-built Pollution Control Measures .....                 | 2-39 |
| 2.9.8.  | Mode of Final Discharge of Treated Effluent.....          | 2-40 |
| 2.9.9.  | Gaseous Emissions .....                                   | 2-44 |
| 2.9.10. | Solid and Hazardous Wastes.....                           | 2-47 |
| 2.9.11. | Noise .....   | 2-48 |
| 2.10.   | CORPORATE SOCIAL RESPONSIBILITY.....                      | 2-48 |
| 2.10.1. | Uttam Bandhan.....  | 2-48 |
| 2.10.2. | Rain Water Harvesting.....                                | 2-49 |
| 3.      | baseline environmental conditions .....                   | 3-1  |
| 3.1.    | Prelude.....  | 3-1  |
| 3.2.    | Physiography and Topography .....                         | 3-1  |
| 3.3.    | Climatology and Meteorology .....                         | 3-2  |
| 3.4.    | Air Environment.....                                      | 3-5  |
| 3.4.1.  | Reconnaissance Survey .....                               | 3-5  |
| 3.4.2.  | Ambient Air Quality (AAQ) Monitoring.....                 | 3-6  |
| 3.4.3.  | Micro - Meteorology .....                                 | 3-6  |
| 3.4.4.  | Baseline Status.....                                      | 3-7  |
| 3.5.    | Noise Environment .....                                   | 3-24 |
| 3.6.    | Water Environment.....                                    | 3-26 |
| 3.6.1.  | Surface Water.....  | 3-26 |
| 3.6.2.  | Ground Water .....  | 3-30 |
| 3.6.3.  | Surface Water Quality.....                                | 3-30 |
| 3.6.4.  | Ground Water Quality.....                                 | 3-30 |
| 3.7.    | Soil.....   | 3-35 |

|         |   |      |
|---------|---|------|
| 3.7.1.  | Introduction.....   | 3-35 |
| 3.7.2.  | Study Area Soil Characteristics .....                                 | 3-35 |
| 3.7.3.  | Physico-Chemical Characteristics of Soil.....                         | 3-37 |
| 3.8.    | Land Use.....   | 3-37 |
| 3.9.    | Biological Environment .....  | 3-41 |
| 3.9.1.  | Land Use Classification .....   | 3-42 |
| 3.10.   | Terrestrial Ecology.....  | 3-42 |
| 3.11.   | Aquatic Environment.....  | 3-45 |
| 3.11.2. | Fauna .....   | 3-45 |
| 3.11.3. | CFCL Complex Green Belt and Plantations .....                         | 3-46 |
| 3.11.4. | Terrestrial Wild Life.....  | 3-47 |
| 3.12.   | Demographic and Socio – Economic Features .....                       | 3-48 |
| 3.12.2. | Amenities.....  | 3-56 |
| 3.12.3. | Socio-Economic Survey.....  | 3-56 |
| 4.      | Impacts Assessment and Prediction .....                               | 4-1  |
| 4.1.    | General .....   | 4-1  |
| 4.2.    | Air Environment.....  | 4-1  |
| 4.2.1.  | Micro-Meteorology.....  | 4-2  |
| 4.2.2.  | Air Quality Modelling and Predictions using the ISCST - 3 Model ..... | 4-2  |
| 4.2.3.  | Predicted GLC due to CFCL Expansion Project.....                      | 4-3  |
| 4.3.    | Noise Environment .....   | 4-11 |
| 4.3.1.  | Impacts due to Transportation .....                                   | 4-12 |
| 4.3.2.  | Impact on Community.....  | 4-12 |
| 4.4.    | Water Environment.....  | 4-12 |
| 4.4.1.  | Water Demand .....  | 4-12 |
| 4.5.    | Land Environment .....  | 4-14 |
| 4.5.1.  | Land Diversion.....   | 4-14 |
| 4.5.2.  | Land Deterioration .....  | 4-14 |
| 4.6.    | Biological Environment .....  | 4-15 |
| 4.6.1.  | Flora .....   | 4-15 |
| 4.6.2.  | Fauna .....   | 4-15 |
| 4.7.    | Socio – Economic Environment.....                                     | 4-16 |
| 4.7.1.  | Positive Impacts .....  | 4-16 |
| 4.7.2.  | Negative Impact.....  | 4-16 |
| 5.      | Environment Management Plan .....                                     | 5-1  |

|         |  |      |
|---------|--|------|
| 5.1.    | Introduction .....   | 5-1  |
| 5.2.    | Objectives of EMP .....  | 5-1  |
| 5.3.    | Components of EMP .....  | 5-1  |
| 5.4.    | Central Pollution Control Board {CPCB} Guide Lines for Fertiliser Industry ..... | 5-2  |
| 5.4.1.  | Emission and Effluent Standards .....  | 5-2  |
| 5.4.2.  | Air Environment .....  | 5-5  |
| 5.4.3.  | Noise Environment .....  | 5-5  |
| 5.4.4.  | Water Environment .....  | 5-5  |
| 5.4.5.  | Rsource Conservation Measures .....  | 5-6  |
| 5.4.6.  | Biological Environment .....   | 5-6  |
| 5.4.7.  | Land Environment .....   | 5-7  |
| 5.4.8.  | Socio - economic Environment .....   | 5-7  |
| 5.4.9.  | Environment Management Cell.....   | 5-7  |
| 5.4.10. | Post – Operational Monitoring Program .....                                      | 5-8  |
| 6.      | hazard evaluation & risk analysis .....  | 6-1  |
| 6.1.    | Introduction .....   | 6-1  |
| 6.2.    | Hazards Survey .....   | 6-1  |
| 6.3.    | Hazard Evaluation .....  | 6-3  |
| 6.4.    | Potential Hazards .....  | 6-3  |
| 6.4.1.  | Toxic Release.....   | 6-3  |
| 6.4.2.  | Flammable Release .....  | 6-4  |
| 6.4.3.  | Jet Release .....  | 6-4  |
| 6.5.    | Inventory Analysis .....   | 6-4  |
| 6.6.    | Methodology, Approach and Damage Criteria for Risk assessment .....              | 6-5  |
| 6.6.1.  | Damage Criteria .....  | 6-6  |
| 6.6.2.  | Selected Failure Cases.....  | 6-6  |
| 6.7.    | General Control Measures.....  | 6-11 |
| 6.7.1.  | Flammable Gas Fires .....  | 6-11 |
| 6.7.2.  | Protection against BLEVE .....   | 6-12 |
| 6.7.3.  | Commonly Recommended Control Measures.....                                       | 6-12 |
| 7.      | On site emergency plan .....   | 7-1  |
| 7.1.    | Introduction .....   | 7-1  |
| 7.2.    | Probable Hazards & Risk.....   | 7-1  |
| 7.3.    | Objectives .....   | 7-2  |
| 7.4.    | Emergency Management Plan .....  | 7-2  |

|         |   |      |
|---------|---|------|
| 7.5.    | Responsibilities & Role of Key Personnel .....  | 7-6  |
| 7.5.1.  | Over all In-charge –President (Operation) .....   | 7-6  |
| 7.5.2.  | Chief Site Coordinator- GM (Prod.).....   | 7-6  |
| 7.5.3.  | Chief Maintenance Coordinator- GM (Maintenance).....  | 7-7  |
| 7.5.4.  | Chief Technical Controller & Environment Coordinator- GM (TS&P).....  | 7-7  |
| 7.5.5.  | Chief Service Coordinator - DGM (HR).....   | 7-8  |
| 7.5.6.  | Chief Railway Traffic Controller- GM (S&D).....   | 7-8  |
| 7.5.7.  | Chief Material Coordinator- GM (Materials) .....  | 7-8  |
| 7.5.8.  | IR Coordinator – SM(P&A).....   | 7-8  |
| 7.5.9.  | Operation Coordinator- DGM-(Prod.-I&II) .....   | 7-9  |
| 7.5.10. | Incident Controller Concerned Plant - SM Concerned Plant.....   | 7-9  |
| 7.5.11. | SM (UPH) / Mgr. (Bagging) / Shift in-charge (Bagging).....  | 7-10 |
| 7.5.12. | Manager Concerned Plant: .....  | 7-10 |
| 7.5.13. | Shift In charge (Concerned Plant):.....   | 7-10 |
| 7.5.14. | Chief Security Officer / Dy Mgr. (Security) Vehicle Control and Security<br>Personnel Deployment at the Locations ..... | 7-11 |
| 7.5.15. | Medical Coordinator- (Mgr –Medical Services).....   | 7-11 |
| 7.5.16. | Fire & Safety Controller- Incharge (F&S) / Dy Mgr. (F&S) .....  | 7-12 |
| 7.5.17. | Environment Coordinator- SM (E&QC)/Dy Mgr. (E&QC).....  | 7-12 |
| 7.5.18. | Civil Coordinator- Mgr (Civil) .....  | 7-12 |
| 7.5.19. | Mgr. IR- To work for Public Relations under SM(P&A) .....   | 7-13 |
| 7.5.20. | In-Charge GAIL Terminal.....  | 7-13 |
| 7.5.21. | Fire Control Room In-Charge –Dy Mgr. (F&S)/ AM (Fire).....  | 7-13 |
| 7.5.22. | Fire Supervisor should also ensure the following: .....   | 7-13 |
| 7.6.    | Post Emergency Recovery .....   | 7-13 |
| 7.6.1.  | Accident Investigation.....   | 7-14 |
| 7.6.2.  | Damage Assessment.....  | 7-14 |
| 7.6.3.  | Cleanup and Restoration .....   | 7-14 |

## List of Tables

|  |      |
|--|------|
| Table 1.1 : Awards & Certifications Received.....  | 1-2  |
| Table 1.2 : Compliance Status of Terms of Reference .....  | 1-6  |
| Table 2.1 : Land Distribution of The Complex .....   | 2-23 |
| Table 2.2 : The water consumption in the expansion project will be in the following areas: ..          | 2-30 |
| Table 2.3 : Water water generated in CFG 3.....  | 2-36 |
| Table 2.4 : Existing Wastewater Quantities .....   | 2-39 |
| Table 2.5 : Characteristics of the existing treated effluent samples .....                             | 2-42 |
| Table 2.6 : Existing & Proposed Project Stack Details.....   | 2-44 |
| Table 2.7 : Flue Gas Characteristics .....   | 2-45 |
| Table 2.8 : Emissions from Prilling Towers.....  | 2-46 |
| Table 2.9 : Emissions Load from Existing Plants and Expansion Project.....                             | 2-46 |
| Table 2.10 : Solid & Hazardous Wastes .....  | 2-47 |
| Table 2.11 : Noise Survey of the Plant .....   | 2-48 |
| Table 3.1 : Meteorological Data (Winter Season) .....  | 3-3  |
| Table 3.2 : Field Monitoring Stations in the Study Area .....  | 3-6  |
| Table 3.3 : Ambient Air Quality Data in and around the CFCL, Gadepan ( $\mu\text{g}/\text{m}^3$ )..... | 3-10 |
| Table 3.4 : National Ambient Air Quality Standards.....  | 3-22 |
| Table 3.5 : Day and Night Noise Levels in the Study Area .....   | 3-24 |
| Table 3.6 : Ambient Air Quality Standards in respect of Noise .....                                    | 3-25 |
| Table 3.7 : Surface Water Analysis of CFCL Gadepan.....  | 3-27 |
| Table 3.8 : Ground Water Analysis of CFCL Gadepan .....  | 3-31 |
| Table 3.9 : Water Quality Standards .....  | 3-34 |
| Table 3.10 : Soil Quality Analysis of CFCL Gadepan .....   | 3-36 |
| Table 3.11 : Landuse category in the Study Area.....   | 3-41 |
| Table 3.12 : Flora existing within the study area of CFCL .....  | 3-43 |
| Table 3.13 : Tree Plantation at CFCL Complex.....  | 3-46 |
| Table 3.14 : Animals Observed in the study area villages .....   | 3-48 |
| Table 3.15 : Socio-Economic Details of the villages in the vicinity of the CFCL Gadepan                | 3-50 |
| Table 3.16 : Amenities Available in the villages around 10km radius from the project site              | 3-53 |
| Table 3.17 : Social Survey conducted in some of the nearby villages of the study area ..               | 3-57 |
| Table 4.1 : Contribution to GLCs (maximum) due to existing CFCL plant stacks.....                      | 4-10 |
| Table 4.2 : Contribution to GLCs (maximum) due to Proposed Expansion Project Stacks                    | 4-10 |