Environmental Impact Assessment Water Quality in terms of Water Quality Index

A Dissertation

Submitted in partial fulfillment of the

requirement for the award of degree of

Masters in Technology

In

Environmental Science and Technology

Submitted by

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TO WHOMSOEVER IT MAY CONCERN

This is to certify that Ms. Shweta Jaiswal had been associated with our organization as an Intern from 15th June 2017 till 14th June 2018.

She was working at the Gurugram office of our organization and her major duties included preparation for EC Application for Category A & B Projects and Preparation of EIA Report of Industry Sector.

Her exposure in these areas has been great. During her tenure with the organization, she has shown a considerable growth being a valuable resource. Moreover, she proactively handled the major responsibilities related to her work.

We take this opportunity to thank her for her contribution and wish her success in all future endeavors.

For Vardan EnviroNet

VARDAN ENVIRONET D 142 Sushant Lok-III GURGAON

Anshul Yadav
General Manager

Date: 14.06.2018
Place: Gurgaon

DECLARATION CUM CERTIFICATE

I hereby declare that the project work entitled 'Environmental Impact Assessment of water in terms of Water Quality Index' is an authentic record of my own work carried out at Vardan EnviroNet as requirement of one year project internship for the award of degree of M. Tech (Environmental Science and Technology), Thapar University, Patiala, under the guidance of S.K. Sharma and K.S. Babu, during June 15, 2017 to June 14, 2018.

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Certified that the above statement made by the student is correct to the best of our knowledge and belief

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ABSTRACT

Water is the elixir of life. It is one of the most essential and important commodities required for a healthy society. The water quality is determined with in 10 km radius area of the Village Suidihi P.O - Lathikata, District - Sundergarh, Odisha. Water samples of ground and surface water from different village were collected to determine the Physico-chemical and Biological status of water to calculate the water quality index. The overall water quality of the study area is fit for the drinking purposes except for the Brahamani river and Rourkela City, here physico-chemical parameters of both ground water and surface water are found to be much higher than the permissible limiting value.

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CHAPTER -1
INTRODUCTION

The most important environment problem faced by the world is the pollution. There are many Natural and Man-made (Construction, Industries, Vehicular, Domestic) sources of pollution. In India industries are the main sources for the air and water pollution.

The distilleries are the most polluting industries in the world. Ministry of Environment and forests (MoEF), define the distillery unit in the Red categories. It generates huge quantity of brown colored effluent called as spent wash, which contain the large amount of organic and Inorganic load. Spent wash is difficult to dispose and costly to treat. Distillery unit are the integrated part of the Sugar industries because the molasses, a by-product of sugar industries is the raw materials for the distillery unit. India manufactures alcohol from the molasses and grain. According to United Nations Food and Agricultural Organization, FAO Stats 2016-17, India is the 2^{nd} largest sugar producing and alcohol producing country in the worlds after Brazil. The main product of the distillery unit is the alcohol and this unit also contributes revenue to the State and the Central Government in the form of tax. According to IWSR (International wines and Sprit record) 46% of tax is generated from the manufacturing process of Alcohol and 54% is generated from the consumption of Alcohol.

Uttar Pradesh has more than 50 percent of the country total installed capacity of alcohol production, Maharashtra and Andra Pradesh have 10 percent each, Bihar 5 percent and Karnataka, Punjab and West Bengal account for 4 - 5 percent each of the total installed capacity in the country **[1]**

1.1 Waste water generated from the Distillery Unit

The distillation industry is a water demanding industry it consume 7-8 liter proteins etc. The effluent generated production process of the distillery unit is termed as *Spent wash* and effluent from utilities like Boiler, Cooling Tower, vacuum pump is of water for every liter production of alcohol and generating around, 6-7 liter of spent wash as effluent. Effluent quantities mainly comprises of organic compound including fibers & termed as

Spent less. The company proposes to follow & set up a "Zero Effluent Discharge" scheme.

1) Process wastewater (Spent wash): After recovery of spent wash from bottom of the distillation section, it will be subjected to anaerobic digestion like Tricking filer or Bio methanation where the suspended solid are separated and converted to Distiller's Dry Grain with Soluble (DDGS) as final by-product which will be utilized as cattle feed/ poultry feed/ fish/ prawn farms etc. Thus this stream will not create any liquid discharge.

Table 1.1: Characteristics of Spent Wash

S.no.	Particulars	Specification
1.	**Temperature**	50-60 Cant grate
2.	**Color**	Dark brown and opaque
3.	**Suspended Solids**	4500-5000 mg/l
4.	**Ph**	4.2 – 4.5
5.	**BOD**	18000 – 20000 mg/l
6.	**COD**	35000-40000 mg/l

Aerobic digestion is followed by the aerobic treatment process like secondly clarifier or membrane technology.

2) Process wastewater (Spent lees): This stream will be cooled & neutralized in Condensate Polishing Unit. It will be then used for Cooling Tower water makeup and for RS dilution. This stream will also not create any liquid discharge.

3) Domestic waste water: It will be treated in septic tank and treated water will be used for gardening purpose **[2].**

Spent wash has high organic and inorganic content, if this spent wash without any prior treatment discharge into the water bodies resulted into the microbial growth widespread morality of aquatic organisms.

CPCB and Ministry of Environment & Forests by the EPA Notification on dated January 8, 1990 **[3]** define the effluent standards for the disposal as per the recipient environment, The BOD at 200 C for 5 days.

30 mg/ L = inland surface water

3 mg/ L = ground water.

100 mg/ L = Irrigation.

To control the pollution from industries, CPCB organize a team on CREP (Corporate Responsibility for Environmental protection) **[4],** according to this guidelines distillery unit had been told to achieve the Zero Liquid discharge by 2005, with the utilization of Spent wash.

50% = March 2004

75% = March 2005

100% = December 2005

1.2 **Water Quality:** Water quality is a complex relation of all the parameter i.e physical, chemical, hydrological and biological characteristics of water. In general, the term "water quality" is defined as "those physical, chemical or Biological characteristics of water by which the user evaluates the acceptability of water".

1.3 **Water Quality Standard:** Water quality standards are the guidelines uses by the Department of Water quality (DEQ) to know if it is adequately protecting—streams, rivers, lakes, and reservoirs. Water quality standards are important because "they let us know whether or not we are sufficiently protecting the quality of surface and Ground waters and provide the goals when that quality must be restored".

Water quality standards are rule of state, territorial, authorized tribal or federal law defined by reputed agencies EPA that define the desired condition of a water body to be maintained for the drinking purpose and the level of protection to be in the future.

These standards are form to control the pollution of different water bodies from different (e.g., Industries, ETP & STP treatment plants, and Sewers Lines).

The water quality standard consists of three basic elements (the "ABCs" of water quality):

1. **Antidegradation:** The main objectives of the Clean Water Act are to “maintain the characteristic of the Nation's waters.” Antidegradation provides a legal framework for maintaining and protecting water quality that has already been achieved".

2. **Beneficial Uses:** It means the standard defined for the specific or expected uses of water body. Typical designated uses include.

3. **Criteria:** there are many States, territories and tribes which have been perceived the water quality criteria for the protection of their water sources. **[5].**

Water quality standard are defined in respect of Drinking water parameter. Many developed countries have defined their own standards to be used in their countries. European Drinking Water Directive defined the standard in the Europe and United States Environmental Protection Agency (EPA) define standards in the United State according to the Safe Drinking Water Act. For the developing countries and countries without a legislative power, World Health Organization (WHO) defined the standard that should be achieved. In 2002 Ministry of Environmental Protection in china defined its own laid down by WHO, CPCB, ICMR (Indian Council of Medical Research). In IS-10500:1991(revision 2004), Bureau of Indian standard defines the drinking water drinking water standard GB3838-2002 (Type II). In India we uses the standard standards. For every parameter BIS defines the 2 limits:

1. Permissible Limit
2. Desirable Limit

1. **Desirable Limit:** "Desirable or acceptable limits means the amount of specific element up to which that particular salt or element can be present in water." Water having that particular element beyond that level is not good for drinking. This limit needs to be implemented.

2. **Permissible Limit:** Permissible limit for that particular element is the amount upto which water can be consumed unless there is no alternate source of water is available

1.4 Water Quality in simple can be defined in 2 categories

1. Use of water
2. On the level of Impurity

1.5 Water Quality on the basis of the uses of water

In the year 1978, CPCB define the guidelines of the for the water monitoring and water quality of the surface water **[6].** Water quality of the surface water was defined on the bases of its uses.

Table 1.2: Classification of water on the basis of designated uses

Designate Use	Quality Classes	Water Quality Criteria
Drinking purpose without any conventional treatment	A	Total coliform organisms (MPN*/100 ml) < 50 • pH = 6.5 to 8.5 • DO = ≥ 6 mg/l • BOD = ≤ 2 mg/l
Domestic purpose	B	Total coliform organisms(MPN/100 ml) < 500 • pH = 6.5 to 8.5 • DO = ≥ 5 mg/l, • BoD = ≤ 3 mg/l
Drinking purpose with some conventional treatment	C	Total coliform organisms(MPN/100 ml) < 5000 • pH = 6 to 9 • DO = ≥ 5mg/l • BOD = ≥ 3 mg/
Breading of wildlife and fisheries	D	• pH 6.5 to 8.5 • DO ≥ 4 mg/l • Free ammonia (as N) ≥ 1.2 mg/l

Irrigation and Industrial	E	• pH 6.0 to 8.5 • Electrical conductivity ≥ 2250 micro mhos/cm, • Sodium Aborption Ratio > 26, • Boron > 2 mg/l.

Source: CPCB guidelines 1978

1.6 Water Quality Index : "Water quality index is defined as a parameter that provides a ranking of the composite effect of individual parameters of water quality to the overall water quality **[7]** A water quality index provides a single number (like a grade) that expresses overall water quality at a certain location and time based on several water quality parameters". The calculation of water quality index (WQI) is done when the raw analytical results for the selected water quality variables, having different units of measurements, are transformed into sub index values which are unitless.

"The objective of an index is to turn complex water quality data into information that is understandable and useable by the public **[8].** This type of index is similar to the index developed for air quality that shows if it's a red or blue air quality day. The use of an index to "grade" water quality is a controversial issue among water quality scientists. A single number cannot tell the whole story of water quality; there are many other water quality parameters that are not included in the index." It gives the public a general idea the possible problems they may face with the water in their specific region.

Water quality of the source will be generating using chemical, biological and physical parameters. Human health can be in danger, if these parameter values are increased from the prescribed limits.

A general WQI approach **[9]** is based factors that are described in the following three steps:

1. ***Parameter Selection:*** The variables are selected from the 5 classes and these are oxygen level, eutrophication, health aspects, physical characteristics and dissolved substances and these variables have the strong impact on water quality, and these are recommended by professional experts, and government bodies.

2. ***To determine Quality Function (curve) for Each Parameter:*** Transformation of the non-dimensional scale values of different units into single indices.

3. ***Sub-Indices Aggregation with Mathematical Expression:*** Arithmetic or Geometric averages.

   Water quality index is a 100 point scale that summarizes results from different measured parameter when complete."The 100 point index can be divided into several ranges corresponding to the **[10]** human consumption of the different water source has been described in terms of Water quality index (WQI), which is one of the most effective ways to describe the quality of water

   There are so many water quality indexes are offered by some national and international organization i.e “Weight Arithmetic Water Quality Index (WAWQI), National Sanitation Foundation Water Quality Index (NSFWQI), Canadian Council of Ministers of the Environment Water Quality Index (CCMEWQI), Oregon Water Quality Index (OWQI)” etc. These WQI have been applied for evaluation of water quality inland and ground water of the particular areas.

   These indices are based on type and number of parameter we choose for our study, with respect to standards. "Water quality indices are accredited to demonstrate annual cycles, spatial and temporal variations in water quality and trends in water quality even at low concentrations in an efficient and timely manner".

1.7 Objective of the study

1. To understand the environment clearance process for the Industry sector as per the EIA notification 2006.
2. To differentiate between EIA notification 1994 and 2006.
3. To understands the positive and negative impact of EIA.
4. To identify the drawback of EIA report in India.
5. Analysis of various phyiso-chemical and Biological parameters of water for the Distillery unit and to reduce the higher number of water parameter into a single expression and obtain an easy interpretation and a single value.
6. Calculate the WQI of the study area.

CHAPTER-2
LITERATURE REVIEW

"Environmental Impact Assessment (EIA) is a process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made. These studies integrate the environmental concerns of developmental activities into the process of decision-making.**" [11]**

2.1 History of EIA

1. United States of America was the first country to define the EIA via its National Environmental Protection Act (NEPA) in 1969. Since then EIA procedure have been implemented in the USA.
2. In 1973, 1974, 1981 and 1984, Canada, Australia, the Netherlands and Japan adopted EIA system respectively.
3. Columbia was the first developing country to adopt the system of EIA in 1974.
4. EIA system in India started in 1976-77, when Planning Commission asked Department of Science & Technology to examine River Valley Project from environmental angle.
5. Till 1994, Environmental Clearance from central government was an administrative decision which lacked legislative support.
6. On 27th January 1984, Union Ministry of Environment & Forest under Environment (Protection) Act 1986, "promulgated EIA notification making Environment clearance mandatory for expansion of any activity or for setting up new project listed in Schedule one of the notification ,which have been amended time to time".
7. More than 29 industries listed under EIA Notification 1994, which require prior Environment clearance.
8. On 14th September, 2006 this notification has been revised.

2.2 Necessity of the EIA study

- EIA study is necessary for sustainable development in any of the country. As from the last 20 year development is inherent to social, economic and environmental changes, whereas development aims to bring about positive changes but these 2 statement leads to conflicts.
- To predict the environmental impact of any of the development activity and to provide an opportunity to mitigate against negative impact and enhance positive impact, the environmental impact assessment procedure was developed.
- Thus the EIA provides a unique opportunity to demonstrate ways in which the environment may be improved as part of the development process. **[12]**

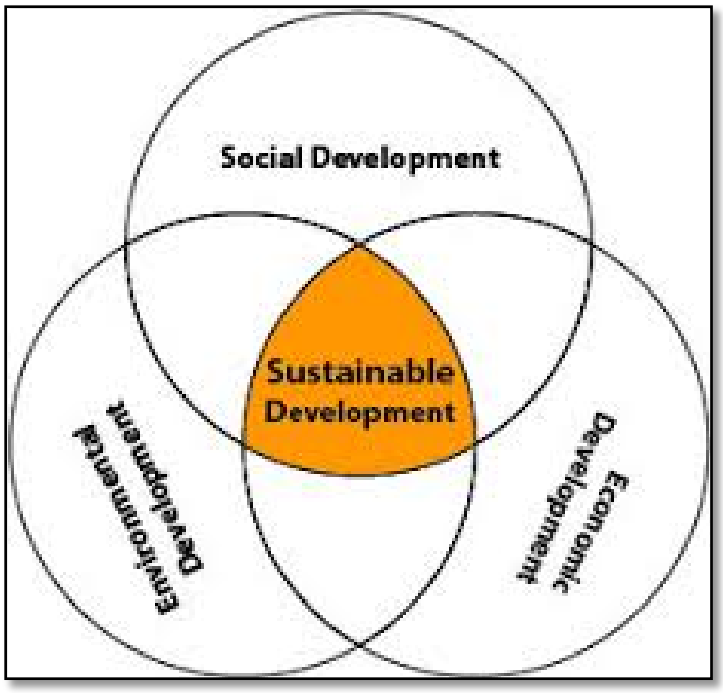

Fig 2.1: EIA for Sustainable Development

2.3 Objective of EIA

- Ensuring environmental factors are considered in the decision-making process
- Ensuring that possible adverse environmental impacts are identified and avoided or minimized
- Informing to the public about the proposal.

- To predict the environmental consequences of human development activities.

2.4 Principal of EIA

It is important to recognize that there is general principal of assessment that applies to EIA, and to other assessment processes. These are following processes:

a. Social Impact Assessment (such as impacts on employment, community interaction)

b. Risk Assessment (such as threats to native animals, water supp)

c. Life Cycle Analysis (such as the impacts at each stage of the project design through to operation and closure)

d. Energy Analysis (such as use of non-renewable energy sources, Greenhouse gas emissions)

e. Health Impact Assessment

f. Species Impact Assessment

g. Technology Assessment

h. Economic Assessment

i. Cumulative Impact Assessment

j. Strategic Environmental Assessment

2.5 EIA Notification 1994

1. In the Notification 1994, All the new projects or the Expansion or modernization of any existing industry that are listed in Schedule 1 require Environment Clearance.
2. Any item falling under entry nos. 3, 18 and 20 of the Schedule 1 to be located or proposed to be located in the areas covered by the Notifications S.0. NO.1 02(E) dated 1st February. 1989 (Doon Valley in UP); S.O. 114(E) dated 20th February. 1991 (Coastal Regulation Zone); S.0. No. 416(E) dated 20th June, 1991 and 8.0. No. 319(E) dated 7th May. 1992(Aravalli Range Notification).
3. Any item falling under entry Nos. 1,2,3,4,5,7,9,10.12,13,14,16.17.19,21,25 and 27 of Schedule-I if the investment is **less than Rs. 50 crores**.
4. Any item reserved for Small Scale Industrial sector with investments **less than Rs. 1 crore.[13]**

1. Nuclear Power and related projects' such as Heavy Water Plants, nuclear fuel complex, rare earths.

2. River Valley projects includinq hydel power, major irrigation and their combination including flood control.

3. Ports, Harbours, Airports (except minor ports and harbours).

4. Petroleum Refineries including crude and product pipelines.

5. Chemical Fertilizers (Nitroqenous and Phosphatic other than sinole superphosphate).

6. Pesticides (Technical).

7. Petrochemical complexes (Both Olefinic and Aromatic) and Petro-chemical intermediates such as DMT, Caprolactam, LAB etc. and production of basic plastics such as LOPE, HOPE. PP, PVC.

8. Bulk drugs and pharmaceuticals.

9. Exploration for oil and gas and their production, transportation and storage.

10. Synthetic Rubber. 11. Asbestos and Asbestos products.

12. Hydrocyanic acid and its derivatives.

13.(a)Primary metallurgical industries (such as production of Iron and Steel, Aluminium,Copper,Zinc, Lead and Ferro Alloys). (b)Electric arc furnaces (Mini Steel Plants).

14. Chlor-alkali industry.

15. Integrated paint complex including manufacture of resins and basic raw materials required in the manufacture of paints.

16. Viscose Staple fibre and filament yarn.

17. Storage batteries integrated with manufacture of oxides of 'Iead and lead antimony alloy.

18. All tourism projects between 200m--500 meters of High TiLle Line or at locations with an elevation of more than 1000 meters with investment of more than Rs. 5 crores.

19. Thermal Power plants.

20. Mining projects (major minerals) with leases more than 5 hectares.

21. Highway Projects.

22. Tarred Roads in Himalayas and/or Forest areas.

23. Distilleries.

24. Raw Skins and Hides.

25. Pulp, paper and newsprint.

26. Dyes.

27. Cement. 28. Foundries (individual). 29. Electroplating.

Fig 2.2: Schedule-1 List of Industries

2.6 EIA Notification 2006 , 14 September

"The objective of EIA Notification 2006 is to address the limitations in the old EIA Notification (1994). Therefore, various modifications have been incorporated in the old Notification, which the ministries claims have been done after taking into account the feedback from the different stakeholder".

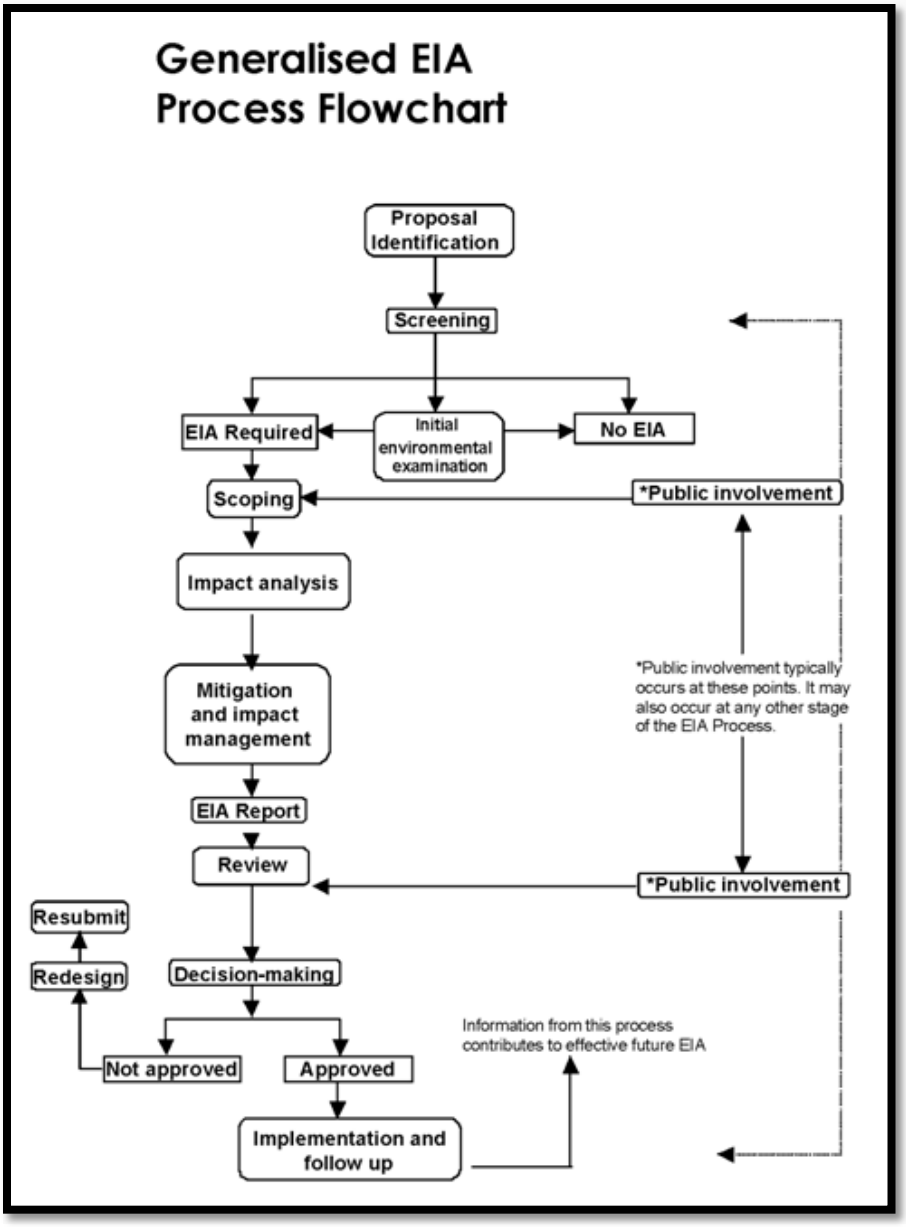

Fig 2.3: EIA process Flow Diagram

2.7 Steps involve in the EIA Study

1. ***Screening:*** This stage involves categorization of the project on the basic of capacity of the project and the general and specific condition, submission of the Form1/PFR on the online portal for the appraisal.

2. ***Scooping:*** This stage include the appraisal of the project by the EAC and SEAC committee after the detailed presentation and ToR will be granted to the project for the EIA study.

3. ***Public Consultation:*** This stage involve the public participation, In this process public hearing has been organised by the State Pollution Control Board to know their views, problem and respected solution related to that project. Public hearing has been organized for almost all the project either A or B category except the project Located in the industrial area or Free Enterprise Zone (FEZ).

   But according to the amendment publish on 27th April, 2018 Public hearing shall be mandatory for the some project whether located in the industrial area. The lists of industries are defined below

   i. Thermal Power Plant
   ii. Nuclear Power Plant
   iii. Coal washeries
   iv. Mineral Beneficiation
   v. Cement Plant
   vi. Petroleum and refining industry
   vii. Coke oven plant
   viii. Asbestos milling and asbestos based product
   ix. Distillery
   x. Pulp and paper mill
   xi. Sugar mill

4. ***Appraisal:*** In this process Environment Clearance (EC) will granted by the Expert committee for that project after the detailed presentation according to the ToR granted.

   List of the Industry that require prior Environment Clarence and their Categorizations per the EIA notification 2006 is attached as ***Appendix-I.***

2.8 Amendments in EIA Notification, 2006

1. Amendment Related to Critical Polluted Areas:

- ***25 August, 2009*:** On this date CPCB, identified 24 critical polluted areas in the country, acc to this amendment for the grant of TOR and EC, SPCB representative must be present their at the time of apprisal of proposal by sector specific EAC in Ministry & comment must be provided on the pollution load in term of Ambient Air Quality , Water Quality, Soil Quality and Solid/ Hazardous Waste.

- ***13 January, 2010*:** CPCB with association of IIT (Delhi) carried out Environmental Assessment of Industrial Clusters across the country based on CEPI (Comprehensive Environmental Pollution Index) with the aim of identifying polluted industrial cluster and priotizing planning needs for invention to improve the quality of environment in these cluster and nation as a whole. 88 Industrial cluster have been identified as a Critical Polluted areas.
  - **a)** Industrial area having aggregated CEPI scores of 70 above should be consider as Critical Polluted and need further detailed investigation in term of the extent of damage and formulation of appropriate remedial Action plan.
  - **b)** Industrial area having aggregated CEPI scores of 60-70 should be considered as Severely polluted and pollution control measure should be efficiently implemented.

- ***22 January, 2010***: According to this project which would received after 13th January, 2010 in MoEF or SEAC foe EC will be returned to the project proponent for the 8th month, till August, 2010,if that project are under the Critical Polluted Areas. During that time the CPCB along with SPCB & UT committee will finalize a time bound action plan and implement that plan for improving the environmental qualities in these area and action plan would be finalized by CPCB and upload that action plan online on the MoEF sites.

- ***15 March, 2010***: In this memorandum CPCB have provided the more detailed about the critical polluted areas because the various states had expressed difficulties in implementing the 13th and 22nd January memorandum due to inadequate details about the boundaries of critical polluted area identified.

- ***26th October, 2010***: As the action plans were not finalized within the prescribed time limit therefore time limit was extended up to 31st October, 2010.

- ***15th Feb 2011***: Some of the state have completed their action plan of critical polluted area with the help of SPCB and Stakeholder Ex : Tarapur (Maharashtra),Vapi (Gujarat), Mandi-Govindgarth (Punjab), Coimbatore (Tamil Nadu), Pattencherru-Bolaram (Andhra Pradesh) and for rest of the 38 area, it had been further extended to 31st March, 2011.

- ***30th March 2011***: Some of the state have completed their action plan of critical polluted area with the help of SPCB and Stakeholder Ex Panipat (Haryana), Ludhiana (Punjab),Agra and Noida (UP) and for rest of the 28 area, it had been further extended to 30st September , 2011.

- ***23 May , 5th July, 27th September 2011*** , dates are further extended for different cluster up to 31st march 2012.

- ***10th June and 1st September*** : Re-imposing on the temporary prohibition of activity in these critical polluted area Ghaziabad (UP), Indore (M.P.), Jharsuguda (Orissa), Ludhiana (Punjab), Panipat (Haryana), Patancheru - Bollaram (A.P.), Singraulli (UP & MP) and Vapi (Gujarat),and requested to re- submit the appropriate remedial Action plan.CPCB is directed to get the re-assessment of CEPI score done at all the critical polluted area after the implementation of remedial action plan.

2. **Amendment Related to Expansion of the Project:**

- ***20th October 2009*:** In this Amendment for the Expansion project theses details are necessary :
  - **a)** Status of Compliance of the condition and environmental safeguards stipulated in the earlier clearance letters.
  - **b)** Detail of court case, if any pending on the direct or indirect**.**

3. **Amendment Related to Public Hearing:**

- ***22nd January, 2010*:** according to this amendment ,it has been decided that any shift in project site location after holding of public hearing or grant of EC will be deemed to be a new proposal and will be appraised afresh as per procedure under EIA Notification, 2006.
- ***19th April, 2010*:** Public hearing advertisement must be spread over a period of Ten days so that as many people as possible are made to aware of such public hearing.

  There is no question of scheduling several public hearing relating to different project at same date, time and venue. This can possibly result in avoidable chaos at such hearing.
- ***16th May, 2014***: Exemption from Public hearing for the project located within the industrial area.

4. **Amendment related to Standardization of ToR on 4th December, 2012** : According to this amendment, Technical guidance manuals was prepared for every 39 development sectors listed in EIA notification 2006, which require prior EC. The manual for each sector include a model ToR, technological option process for a cleaner production, waste minimization, monitoring of environmental quality related regulation and procedure for obtaining EC. These manuals have also served as guidance manuals for EAC, SEAC who have been assigned the task of screening, scoping and appraisal of projects of various sectors for grant of EC.

5. **Amendment related to validity to ToR**

    - ***22nd March, 2010*:** According to this amendment, form 1st April, 2010, the EIA/EMP reports would be submit with in 2 year after the issues of ToR including public consultation where so required. The period can be extended to 3rd year on proper justification.
    - ***29th August,2017* :** According to this amendment , the validity of ToR for all the project would be three year and outer limit of ToR would be four year

6. **Amendment related to EIA Notification, 2006 applicable for Cases where Land has already acquired prior EIA Notification, 1994 on 15th January,2008 :** The project that are not listed in EIA Notification, 1994 and are listed under 2006 shall not require EC only on one condition if the NOC for that project was granted before 14-September 2006.Example- TSDFs, CETPs.

7. **Amendment related for maintenance of transparency on 4th November,2008**: According to this amendment, project authorities are requested to provide their mail ID for the communications of TORs, clearance letter and queries etc in addition to the conventional system via couriers

8. **Amendments related to the violation of cases, 14th March, 2017 :** MoEF & CC has provided the opportunity to all those project which have not obtained prior EC as these project have started the work on site, expanded the production beyond the limit of EC or change the production mix without obtaining prior EC, by implementing the violation window. This is one time opportunity for six month to apply for EC to the project which are in violation on the date of notification i.e 14th March, 2017.

9. **Amendment related to Extension of validity of EC letter on 29th April, 2015 :** According to this amendment the validity for the EC letter was raised from 5 to 7 years**.[14]**

2.9 Difference between the EIA notification 1994 and 2006

a. The basic difference between EIA Notification, 1994 and 2006 is that the former is based on project investment whereas the later is based on pollution load of the industry.

b. No NOC for EC

c. Categorization into A and B1 & B2 (given in annexure).

d. Appraisal of Category A project at Central level and Category B1, B2 at State Level (with exceptions).

e. Information of the project in Form-1/Form-1-A

f. Scoping stage to determine the ToR point for the EIA study related to the project.

g. Public hearing structured to evaluate the problem of people related to that project, organized by SPCB (within 45 days) and proceedings to be video graphed and MoEF to intervene if PH not held in time.

h. Time bound for the every stage to be performed by State Level Environment Impact Assessment Authority (SEIAA), Expert Appraisal Committees (EAC) and project representative.

2.10 Positive impact of EIA

To proponent (Industry owner)

- ✓ Reduction in cost and time of project implementation.
- ✓ Modifications in project designs are cost effective.
- ✓ The chances of project acceptance increases.
- ✓ The impacts and violations of laws and regulations are avoided.
- ✓ There is improvement in project performance.

To public

- ✓ Local environment is healthier.
- ✓ Environment Management.
- ✓ There is improvement in human health.
- ✓ Biodiversity is maintained.
- ✓ Dependability on natural resource is decreased.
- ✓ Increased community skills, knowledge and pride**.[15]**

2.11 Drawback of EIA process in India

1. Absence of centralized databank, False, unreliable and doubtful data; Inadequate single season data in Rapid EIA.
2. Deliberate omission of vital information which may be alter the fate of project.
3. EIA is funded by agency whose primary business is to obtain clearance; it cannot be unbiased.
4. No accreditation of EIA consultancy. Many a times, consultancies working on a project have no specialization on concerned subjects.
5. The EIA documents are bulky and technical and make it really difficult to help in decision making.
6. Plagiarism in EIA reports, wherein the same facts used for two different places.
7. False assumption that once site clearance is granted, environment clearance will follow. The developers start construction work such as housing colonies, roads etc. However, in EIA notification, it is mentioned that such works should not be taken before environmental clearance.
8. In some cases, environment clearance is granted despite of public objection. In other cases, staged public hearing is carried out without involving the really affected people **[16].**

2.12 Waste Water Treatment Technology Used in the Distillery Unit:

DECANTATION

To separate solid matter from spent wash stream Decanter centrifuge is used. This decanter centrifuge consists of a bowl rotating at high speed and a screen conveyer running which runs at different speeds. In this process segregation of solids from the slurry is set in motion by applying centrifugal force. Spent wash is recovered from the bottom of the analyzer column of the distillation process. Spent wash is highly polluting wastewater stream. This spent wash will be sent to decantation section where the solids in the form of wet cake (30-35% w/w solids) will be separated from the thin slop. The wet cake/ DWGS (Distiller's Wet Grain with Soluble) will be further subjected to Drier where it will be converted into DDGS (Distiller's Dry Grain

with Soluble) which will be sold as a cattle feed. The thin slop will be sent to further treatment Bio-Methnation System.

Table 2.1: Composition of wet cake

Parameter	Value (%)
Total Solid	30 - 50
Moisture	70 - 72
Starch	1.9 - 2.1
Proteins	4 - 7
Oils/Fats	0.4 – 1.0
Crude Fibers	1.0-1.7
Inorg.Ash	0.45 – 1.3

The thin slop (9-10% w/w solids) from the decantation section will be further treated and Concentrated into Bio-Digester System (Primary Treatment unit). The thin slop will be concentrated till the solids get concentrated to 30-35% w/w solids. This thin slop slurry will be mixed with DWGS and sent for it its further treatment in Drier and finally converted to DDGS having 80-90% w/w solids. And waste water further treated in the secondary treatment unit which can be used in the agriculture system.

Waste Water Treatment Unit

1. Equalization Tank.
2. UASB Digester
3. Anaerobic Filter.
4. Aeration Tank NO 1 & Aeration Tank NO 2 .
5. Clarification (Clarifier)
6. Sludge Drying Bed
7. Sand Filter
8. Water Storage

BIO DIGESTOR System (Primary Treatment Unit)

UASB Reactor: **U**p-flow **A**naerobic **S**ludge **B**lanket reactor is provided for anaerobic treatment of dairy effluent. The UASB reactor shall be constructed in RCC. The reactor consists of three zones viz. Influent distribution zone, Reaction zone, Gas solid liquid separation zone.

Influent Distribution zone: The raw wastewater enters into the at the bottom through influent distribution zone. A sophisticatedly designed piping net work is provided for uniform distribution of the effluent in the tank. The effluent then travels upward in the reactor.

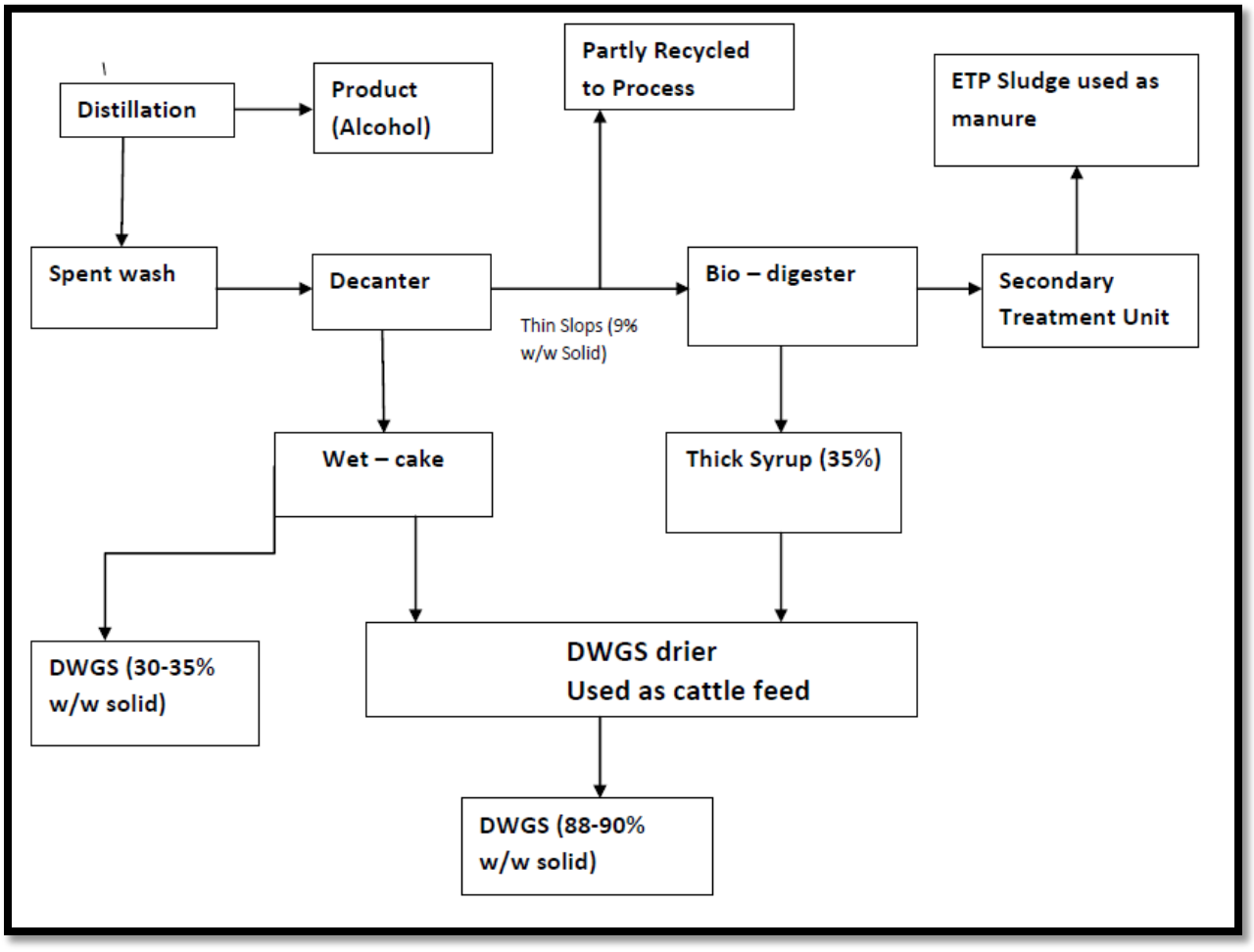

Fig 2.4: Effluent Treatment flow chart

In UASB process both the stages are completed in single reactor. The biogas so produced is bubbled through the effluent and is separated out in the third section i.e. Gas-Solid-Liquid separation zone. The suspended solids are also separated to prevent escape of solids from the reactor. The UASB Reactor shall be fabricated in MS and painted with Epoxy paint.

Flare Stack Flare stack fabricated in MS and painted with Epoxy paint shall be provided for burning the Gas generated in UASB Reactor. The flare stack shall be ignited manually.

Gas Holder: A gas Holder fabricated in MS shall be provided for storing the gas and carrying it for utilization. The gas holder shall consist of MS floating dome and RCC wet well. The gas stored in the Holder shall then be pumped to boiler using biogas Blower.

Table 2.2: Designed Characteristics of untreated and treated effluent after Primary Treatment Unit

Parameter	**Untreated**	**Treated**
Flow (m3/day)	87.6	
pH	4.2 – 4.5	6.5 -7.5
BOD (mg/l)	18000-20000	7200 – 8000
COD (mg/l)	35000-40000	14000 - 16000
T.D.S	3500-4000	2100

Note: Efficiency will be 60%.

Table 2.3: Technical Specifications of primary treatment unit

Unit	UASB REACTOR
Tank Geometry	M.S. Cylindrical Tank
Tank MOC	M.S. Epoxy
Design COD Kg/Day	6500 kg/Day
COD loading rate	6 Kg COD / M3/Day
Reactor Volume Reqd	1621 M3
Diameter of Reactor	14.2 m
Liquid Height	10.15 m
Free Board	.30m
Retention Time	19 days
Gas Generation	200 m3/Day

Secondary Treatment Unit

Equalization Suspended solids removed here through the gravel filtration Media. The anaerobic filter the effluent is taken to the aeration tank. The complete biological Oxidation shall take plase in the Aeration System . The oxygen required for the Oxidation is provided Through surface Aerators. The Effluent from the Aeration System will be the taken to a Secondary Clarifier (High Efficiency gravity Clarifier) .The Biological sludge is separated in the secondary clarifier . Sludge is taken to Sludge drying beds for sludge for sludge decanting. The clarified treated sewage In the treated water tank True to Filter The treated effluent will be collected in a Storage tank and will be with him the permissible parameters laid down by the state Pollution control board and it Will also be free from any odour or colour and May be used for irrigation, Lend , Horticulture , etc.

Table 2.4: Characteristics of Treated effluent after Secondary Treatment

Parameter	Treated
Flow (m3/day)	<_24 m3/day
pH	<_ 6.5 -7.5
BOD (mg/l)	<_30 mg/l
COD (mg/l)	<_250mg/l
T.D.S	<_100 mg/l

2.13 History Of WQI : In 1965, Horton from United States, developed the WQI by "selecting 10 most commonly used water quality variables like dissolved oxygen (DO), pH, coliforms, specific conductance, alkalinity and chloride etc." which are widely applied and accepted in European, African and Asian countries. A water index similar to Hortan . Brown (1970) developed WQI **[17]** which was based on weights to individual parameter and improved by Deininger for the Scottish Development Department (1975). Much of the work has been done on the water quality indices of several rivers of India and abroad by various workers viz., **[18, 19, 20].** The WQI was defined after the NSFWQI where the Delphi method was used for variable selection **[21]**

CHAPTER-3

MATERIALS & METHODS

3.1 Project Detail

M/s Suidihi Distillery Private Limited (SDPL). is proposing for Capacity Expansion from existing capacity of M/s SDPL from **6KLPD (Molasses /grain based) to expansion phase-1:** to **12 KLPD** (grain based only) in existing manufacturing unit with no additional land requirement and **Phase-2 expansion from 12 KLPD to 65 KLPD (grain based**) Distillery Unit along with 1.5 MW Cogeneration Power Plant at- village Suidihi, P.O - Lathikata, District - Sundergarh, Odisha.

3.2 Land Requirement

The existing 6 KLPD plant is set up in an area of 6.56 Acres. The proposed Phase-1 plant will be set up within the Existing Plant & Machinery and for the Phase-2, Distillery plant will be set up in an area of 13.23 acres.

3.3 Water Requirement

Water is required in the processes such as dilution, fermentation, liquefaction and distillation, boiler feeding and non-process uses such as cooling for fermenters and condensers, floor washing, domestic, sanitary, gardening, green belt irrigation, bottle washing and bottling,. The total water requirement and fresh water requirement for the proposed project will be given below in Table 3.1.

Table No 3.1: Water Requirement for the Project

S.No	Total water requirement	Fresh water requirement	Source
1		Phase 1: 104 KLD	Ground water Ground water approval application has been applied to Department of

2	Phase 2: 1522 KLD	Phase 2 : 525 KLD	Water resources and attached as Annexure III.

3.4 Study Area

Suidihi village is located in Lathikata, Thesil of Sundergarh district in Odisha, India. It is situated 3 km away from sub-district headquarter Lathikata and 122km away from district headquarter Sundergarh. The total geographical area of village is 161 hectares .Raurkela is nearest town to Suidihi which is approx 18km away.

The study area was defined within 10 km radius around the proposed project site. Total 44 villages are coming within the 10 km radius of the study area. The villages are from Lathikata, Bisra and Gurundia Tehsil of Sundargarh District of Orissa State. The study area also includes the urban area i.e Jalda, Hatibandh, Lathikata and Kulunga Industrial Estate & other Colony. The study area show the following land use patterns area. LU/LC study of the area is defined in the table 3.2 and about 3.2% of the total area covered with water:

Table – 3.2: Land use pattern f the study area

Land-Use	Area (in Hectares)	% Area
Settlement	2228	7.4
Scrub land	4307	14.3
Water Body	968	3.2
Follow Land	8380	27.9
Industry	714	2.4
Agriculture land	7169	23.8
Rocky & Waste Land	99	0.3
Forest	4887	16.2
Riverbed Area	1325	4.5
Total Area	**30077**	**100**

3.5 Drainage details

The major in the study area is Brahmini River which is at the distance 3 km in west from the project site. Brahmini River originates in other states but a

maximum portion of their catchments lie in Odisha and drain out in the Bay of Bengal. A seasonal river suidihi nala is also there at a distance 0.5km in south from the project site. The detailed drainage pattern of the study area is show in the Fig 3.1:

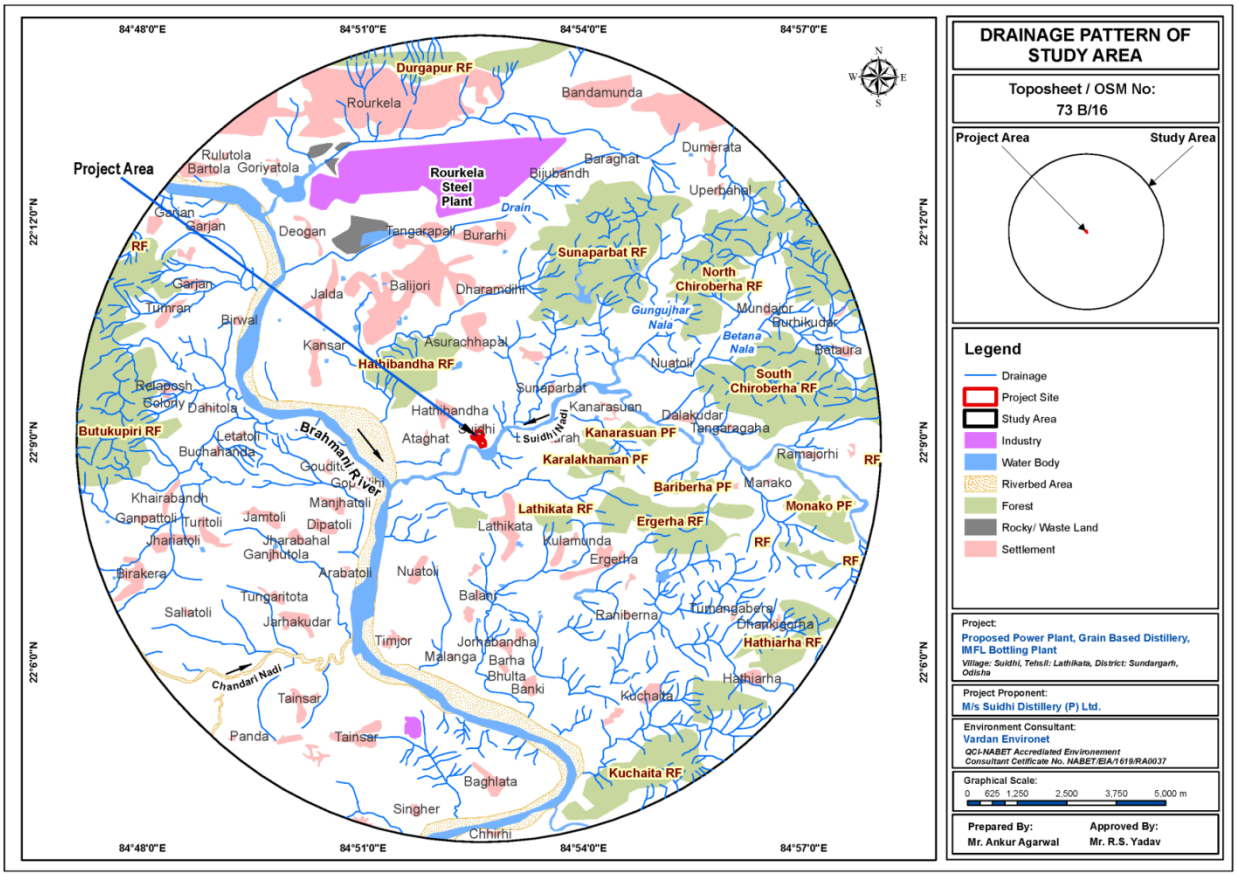

Figure 3.1: Drainage map of the Study Area

3.6 Screening Category

As per EIA Notification dated 14th Sept., 2006 and amended from time to time, the proposed project falls under Category "A", Project or Activity 5(g) due to molasses/grain based plant.

3.7 Period of involvement

There was no ToR presentation for proposed project and standard ToR was granted by Expert Appraisal Committee on14th August, 2017. Accordingly the baseline environmental study has been done for the period **1stOctober, 2017 to 31stDecember 2017**, as well as secondary data also collected from different sources.

The water samples from the different location shown in the table 3.3 and 3.4 and in the Fig 3.2 were collected out during the study period **by M/s. Vardan Envirolab Team** in accordance with the Guidelines for EIA issued by the Ministry of Environment Forests and Climate Change, Govt. of India and CPCB, New Delhi and eight physicochemical parameter were analysed. The parameter like pH, Electrical conductivity, Dissolve oxygen were monitored at the site and rest of the sample were analyzed in the **M/s Vardan Envirolab , Gurgaon {NABL Accredited Lab, Certificate No. TC-6299 ,MOEFCC NO. S.O. 1783 (E) dated 18.09.2017}** as per the standard procedure after preservation defined by the CPCB guidelines and APHA manual. Total 12 parameter were analyzed i.e ph, Total Dissolve Solid, Calcium, Chlorine, Flouride, Alkalinity, Hardness, magnesium, Nitrites, Sulphate.

Table 3.3: Surface Water Sampling Location

Station	Sampling Location	Co-ordinates		Distance (Km)	Direction
		Latitude	Longitude		
SW1	Stream Near Suidhi River	22°08'50.4"N	84°52'47.2"E	0.50	SE
SW2	Stream Near Hathibandha R.F	22°10'10.0"N	84°51'41.7"E	2.58	NW
SW3	Stream Near Bariberha P.F	22°08'23.1"N	84°55'23.9"E	4.94	SW
SW4	Downstream of Brahmani River	22°04'20.1"N	84°53'52.1"E	8.75	SE
SW5	Pond Near Balani	22°07'03.0"N	84°52'50.4"E	3.3	S
SW6	Pond near Jalda	22°11'11.9"N	84°50'44.2"E	4.9	NW
SW7	Pond near Sunaparbat RF	22°10'53.6"N	84°54'08.0"E	4.2	NE

Fig 3.4: Ground Water Sampling Location

Station	Sampling Location	Latitude	Longitude	Distance (Km)	Direction
W1	Project Site	28°12'11.8" N	76°51'19.9" E	--	--
W2	Sunaparbat	22°09'46.8"N	84°53'35.0"E	2.13	NE
W3	Rourkela	22°13'33.1"N	84°51'09.4"E	8.79	NW
W4	Gopodih	22°08'29.5"N	84°50'57.0"E	3.09	SW
W5	Lathikata	22°08'19.1"N	84°52'56.0"E	1.2	SSE
W6	Hathibandha	22°09'32.5"N	84°52'01.0"E	1.2	NW
W7	Manako	22°08'26.9"N	84°56'00.8"E	5.8	ESE
W8	Kuchaita	22°05'39.3"N	84°54'56.5"E	7.41	SE

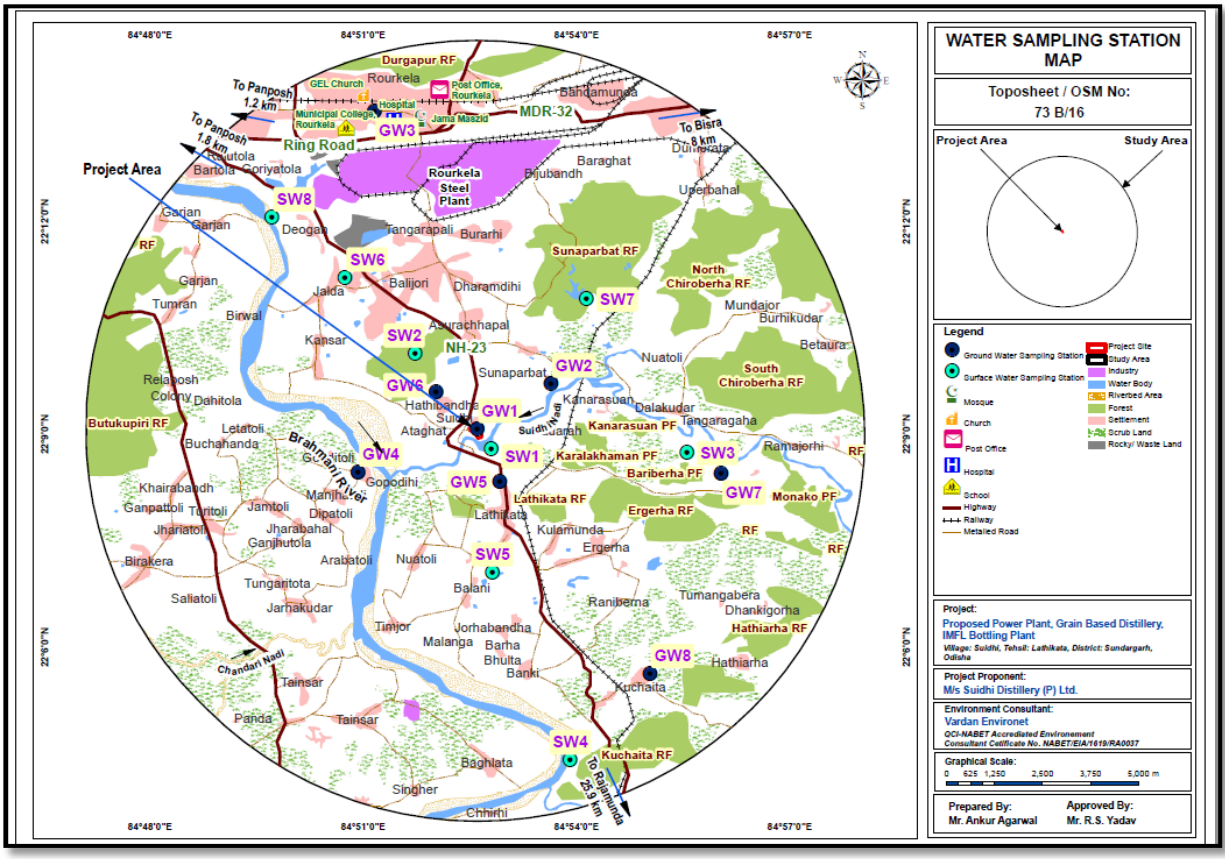

Figure 3.2: Sampling Location Map

3.8 Sample preservation Method

Preservation mean to hinder biological action, hinder hydrolysis of chemical ounds and

Complexes various Preservation Method:

1. ph Control:
2. Chemical Addition
3. Amber Or Opaque Bottles
4. Filtration
5. Refrigeration or Freezing

Chemical preservation method are used, when no interference will be seen and add them to the sample bottle as soon as sample were. No single preservation method is entirely satisfactory; choose the preservation method which does't interference with the analysis technique and samples for multiple determinations may need to be split and preserved separately.

Metal cations are loss with absorption and ion exchange with the walls of glass containers. Lower pH minimizes the precipitation and absorption to container walls. For metals analysis Samples should be acidified to below pH 2 with conc. HNO3 (aluminum, cadmium, chromium, copper, iron, lead, manganese, silver, and zinc).

For the changes in the nitrate-nitrite-ammonia content, or decreases in phenol concentration Microbial action may be responsible. Sulfide, sulfite, ferrous iron, iodide, and cyanide may be lost through oxidation. That’s why samples for ammoniacal nitrogen, total oxidisednitrogen and phenol analysis should be preserved below pH 2 by addition of conc. H2SO4..For COD analysis also sample should be preserved below pH 2 by addition of conc. H2SO4.

Microbial action may be responsible for reducing sulfate to sulfide in Biological Oxygen Demand (BOD). Residual chlorine is reduced to chloride. That’s why Samples for BOD and bacteriological analyses should be stored at a temp. < 4oC (ice/cold packs) and in the dark as soon as possible after sampling

Table 3.5 : Sample Preservation

Parameter	Container	Minimum Sample Size (ml)	Preservative	Holding Time
Microbiology				
Coliform, Total or Fecal and E. coli	Sterile Container	100	Cool at 4° Celsius	24 hours
Organics				
BOD	Plastic & Glass	1000	Cool at 4° Celsius	48 hours
COD	Plastic & Glass	50	Cool at 4° Celsius Drop the ph > 2 with H_2So_4	28 days
Metals	Plastic & Glass	200	Filter on site Drop the ph > 2 with HNo_3	6 months
Chromium	Plastic & Glass	200	Cool at 4° Celsius	24 hour
Inorganics, Non-Metallics				
Chloride	Plastic & Glass	50	-	28 days
Chlorine	Plastic & Glass	200	-	Analyzed Immediately
Cyanides	Plastic & Glass	500	NaOH to pH > 12, Cool 6C	14 days
Fluorides	Plastic & Glass	300	-	28 days
No_x	Plastic & Glass	100	Cool at 4° Celsius Drop the ph > 2 with H_2So_4	28 days
Phosphorous	Plastic & Glass	500	Cool at 4° Celsius	28 days

			Drop the ph > 2 with H_2So_4	
Sulphate	Plastic & Glass	500	-	28 days
DO	Plastic & Class	500		Analyzed Immediately
Phenolics	Glass	500	Cool at 4° Celsius Drop the ph > 2 with H_2So_4	28 days
Physical	Plastic & Glass			
Turbidity	Plastic & Glass	250	Cool at 4° Celsius	48 hours
TSS, TDS, TVS	Plastic & Glass	500	Cool at 4° Celsius	7 days
Hardness	Plastic & Glass	500	HNO3 - pH below 2	6 month
Color	Plastic & Glass	50	Cool at 4° Celsius	48 hour
Odor	Glass	200	Cool at 4° Celsius	24 hour
pH	Plastic & Glass	25	-	Analyzed Immediately
Temperature	Glass	1000	-	Analyzed Immediately

3.9 WQI Calculation Method

In this study, we have used the **weighted arithmetic water quality Index** method. This method defines the water quality index acc to degree of purity with the analysis various water quality parameter. The wqi has been calculated using the standard drinking water parameter and the formula used to calculate the WQI **[22]**

$$WQI = \frac{\sum Q_i * W_i}{\sum W_i}$$

Q_i is the quality rating scale which is calculate using the expression given below:

$$Q_i = \frac{100[(Vi - Vo)]}{Si - Vo}$$

V_i = Estimated concentration of the parameter

V_o = Ideal value of parameter

V_o = 0 for all the parameter (except pH = 7 and DO = 14 mg/L)

S_i = Standard value of parameter define by the BIS, WHO

W_i = Unit weight of each parameter which is calculated with the formula define below:

$$W_i = \frac{K}{S_i}$$

K = proportionality of constant and this can calculated with the formula define below:

$$\frac{1}{\sum \left(\frac{1}{S_i}\right)}$$

Table 3.6: The WQI rating define acc to the table given below:

WQI values	**Grading**	**WQI**
0-25	A	Excellent
26-50	B	Good
51-75	C	Poor
76-100	D	Very poor
Above 100	E	Unsuitable for drinking purpose

CHAPTER-4

RESULT AND DISCUSSION

Table 4.1:Ground water quality analysis results

S.No.	Parameter	W1	W2	W3	W4	W5	W6	W7	W8
1	pH	7.45	7.63	6.59	7.36	7.27	7.5	7.46	7.6
2	Electrical Conductivity	240	240	388	296	221	208	274	284
3	Total Dissolved Solids	105	143	329	177	132	124	164	170
4	Total alkalinity as CaCO3	68.32	84.26	145	98.45	88.26	75.36	93.61	96.25
5	Total Hardness as CaCO3	78.23	98.53	150	118.3	92.21	87.61	109.53	113.55
6	Calcium	20.65	32.25	52	36.54	23.32	23.23	33.45	35.61
7	Magnesium	6.49	4.39	4.86	6.59	6.45	7.21	6.34	6
8	Chlorides	18.51	22.32	31.9	30.53	16.2	18.35	26.45	28.44
9	Nitrate	0.98	8.56	23.6	11.21	8.36	6.78	12.36	14.16
10	Sulphate	8.23	12.33	15.06	14.23	9.74	12.66	13.55	10.58

Table 4.2: Surface water quality analysis results

S.No.	Parameter	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
1	pH	7.63	7.76	7.82	7.53	7.66	7.48	7.58	7.73
2	Electrical Conductivity	182	164	215	208	712	661	203	217
3	Total Dissolved Solids	108	98	129	124	427	396	385	110
4	Total alkalinity as CaCO3	72.46	66.49	88.36	84.56	188.15	176.65	158.65	93.14

5	Total Hardness as CaCO3	63.76	58.23	77.23	72.63	235.36	224.52	205.82	78.66
6	Calcium	12.67	15.52	15.52	13.62	68.64	63.45	60.15	15.12
7	Magnesium	7.81	7.8	9.36	9.39	15.58	16.09	13.55	9.95
8	Chlorides	16.39	14.78	18.2	16.78	102.3	95.36	87.53	17.32
9	Nitrate	1.12	105	1.18	1.15	13.62	13.22	16.1	1.14
10	Sulphate	10.45	9.58	12.36	14.55	51.42	45.63	52.25	14.55
11	BoD	0	0	0	11.6	0	0	0	6.2

Table 4.3: Drinking water standard and their unit weight

parameter	**Desirable Limit (Standard)**	**Permissible Limit**	**unit**	**idel value (Vid)**	**Unit Weight**
pH	6.5	8.5	mg/l	7	0.117647
Electrical Conductivity	300	-	µS/cm	0	0.003333
Total Dissolved Solids	500	2000	mg/L	0	0.002
Total alkalinity as CaCO3	200	600	mg/L	0	0.005
Total Hardness as CaCO3	200	600	mg/L	0	0.005
Calcium	75	200	mg/L	0	0.002
Magnesium	30	100	mg/L	0	0.013333
Chlorides	250	1000	mg/L	0	0.033333
Nitrate	45	No-relaxation	mg/L	0	0.004
Sulphate	200	400	mg/L	0	0.022222
BOD	5	-	mg/L	0	0.005

These standards are recommended by the Bureau of India - IS-10500 (2012) and ICMR (Indian Council of medical and research institute).

Table 4.4: Water Quality Index for the Ground Water

Station	Sampling Location	WQI	Status
W1	Project Site	25.57	Good
W2	Sunaparbat	34.49	Good
W3	Rourkela	67.33	Poor
W4	Gopodih	27.43	Good
W5	Lathikata	21.16	Excellent
W6	Hathibandha	29.50	Good
W7	Manako	30.69	Good
W8	Kuchaita	36.44	Good

Table 4.5: Water Quality Index for the Surface Water

Station	Sampling Location	WQI	Status
SW1	Stream Near Suidhi River	16.37	Excellent
SW2	Stream Near Hathibandha R.F	31.32	Good
SW3	Stream Near Bariberha P.F	20.86	Excellent
SW4	Downstream of Brahmani River	128	Unsuitable for Drinking Purpose
SW5	Pond Near Balani	27	Good
SW6	Pond near Jalda	23.11	Excellent
SW7	Pond near Sunaparbat RF	23.07	Excellent
SW8	Upstream of Brahmani River	79.67	Very poor

DISCUSSION: Water quality index of the study area is established from the various physicochemical parameter of the different area. The value of various calculated parameter for the ground and surface water are described in the table 4.1 and4.2 and location wise calculated WQI for the eight location of ground and surface water are described in the table 4.4 and 4.5

The water quality of the ground water categories into 'B' grade (WQI = 26-50) except Rourkela and Lathikata, In Rourkela water quality of the ground water is poor and categories into 'C' grade (WQI= 67.33) and whereas in Lathikata water quality is quite opposite to Rourkela and categories into 'A' grade (WQI= 21.16). The major reason for the poor quality in the Rourkela is the Rourkela Steel Plant (RSP), that generate the huge amounts of waste substances (solid waste, waste water), which mixed with the ground water.

The surface water quality of the different sampling location shows the Excellent result, as these are the seasonal source of water which are designed mainly for the domestic purpose further the sample were collected in the month of the October which is the post monsoon season and categories into 'A' grade except the Brahmani river at the downstream (WQI = 128), here the water quality is worst and mark as unsuitable for the drinking purpose without any treatment process. The poor quality of the Brahmani river at the downstream is due to the discharged of industrial (partially meeting the prescribed norm of discharged) as well as domestic sewage water and more over the rainy season also created the disturbance the in the river.

WQI for the ground water of the project site is categories into 'B' grade (WQI = 25.57) and nearest Stream Suidihi Nala from the project site is categories into 'A' garde (WQI= 16.37). This results indicates that there is no discharge of the effluent either in the ground water or the surface water and hence we can conclude that Effluent Treatment Plant is working efficiently.

CHAPTER-5
CONCLUSION

1. EIA Study has been necessary steps for every industry. In the EIA study, we assess all the expected pollution and provide their mitigation plan and every six month compliance report also submit to the State Pollution Control Board, to have check on that all the mitigation plan are working efficiently
2. Environment protection agency must be more careful and precise about the study conducted by the consultants
3. There is no discharge of effluent from the industry and ETP is working efficiently.
4. Brahamini river water is unsuitable for the drinking purpose
5. This is due to the discharge of the industry waste water and sewage water. CPCB, BIS and ICMR has prescribed the various norms of the industrial waste water discharge but the industrial are meeting these NORM partially and discharged these waste into the river and to control and minimize these pollution.

Appendix-I

LIST OF PROJECTS OR ACTIVITIES REQUIRING PRIOR ENVIRONMENTAL CLEARANCE

Project		Category with threshold limit		Conditions if any
		A	**B**	
3		Materials Production		
(1)	(2)	(3)	(4)	(5)
3(a)	Metallurgical industries (ferrous & non ferrous)	a)Primary metallurgical industry All projects b) Sponge iron manufacturing ≥ 200TPD c)Secondary metallurgical processing industry All toxic and heavy metal producing units ≥ 20,000 tonnes /annum -	Sponge iron manufacturing <200TPD Secondary metallurgical processing industry i.)All toxic andheavymetal producing units <20,000 tonnes /annum ii.)All other non –toxic secondary metallurgical processing industries >5000 tonnes/annum	General Condition shall apply for Sponge iron manufacturing
3(b)	Cement plants	≥ 1.0 million tonnes/annum production capacity	<1.0 million tonnes/annum production capacity. All Stand alone grinding units	General Condition shall apply

4		**Materials Processing**		
(1)	(2)	(3)	(4)	(5)
4(a)	Petroleum refining industry	All projects	-	-
4(b)	Coke oven plants	≥2,50,000 tonnes/annum -	<2,50,000 & ≥25,000 tonnes/annum	-
4(c)	Asbestos milling and asbestos based products	All projects	-	-
4(d)	Chlor-alkali industry	≥300 TPD production capacityor a unit located out side the notified industrial area/ estate	<300 TPD production capacity and located within a notified industrial area/ estate	Specific Condition shall apply No new Mercury Cell based plants will be permitted and existing units converting to membrane cell technology are exempted from this Notification
4(e)	Soda ash Industry	All projects	-	-
4(f)	Leather/skin/hide processing industry	New projects outside the industrial area or expansion of existing units out side the industrial area	All new or expansion of projects located within a notified industrial area/ estate	Specific condition shall apply
5		Manufacturing/Fabrication		
5(a)	Chemical fertilizers	All projects	-	-
5(b)	Pesticides industry and pesticide specific intermediates (excluding formulations)	All units producing technical grade pesticides	-	-

(1)	(2)	(3)	(4)	(5)
5(c)	Petro-chemical complexes (industries based on processing of petroleum fractions & natural gas and/or reforming to aromatics)	All projects -	-	-
5(d)	Manmade fibres manufacturing	Rayon	Others	General Condition shall apply
5(e)	Petrochemical based processing (processes other than cracking & reformation and not covered under the complexes)	Located out side the notified industrial area/ estate -	Located in a notified industrial area/ estate	Specific Condition shall apply
5(f)	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	Located out side the notified industrial area/ estate	Located in a notified industrial area/ estate	Specific Condition shall apply
5(g)	Distilleries	(i)All Molasses based	All Cane juice/non-molasses based distilleries –	General Condition shall apply

		distilleries (ii) All Cane juice/ non-molasses based distilleries ≥30 KLD	<30 KLD	
5(h)	Integrated paint industry	-	All projects	General Condition shall apply
(1)	(2)	(3)	(4)	(5)
5(i)	Pulp & paper industry excluding manufacturing of paper from waste paper and manufacture of paper from ready pulp with out bleaching	Pulp manufacturing and Pulp& Paper manufacturing industry -	Paper manufacturing industry without pulp manufacturing	General Condition shall apply
5(j)	Sugar Industry	- -	≥ 5000 tcd cane crushing capacity	General Condition shall apply
5(k)	Induction/arc furnaces/cupola furnaces 5TPH or more	- -	All projects	General Condition shall apply

General Condition (GC):

- Protected Areas notified under the Wild Life (Protection) Act, 1972,
- Critically Polluted areas as notified by the Central Pollution Control Board from time to time,
- Notified Eco-sensitive areas,
- Inter-State boundaries and international boundaries.

Specific Condition (SC):

If any Industrial Estate/Complex / Export processing Zones /Special Economic Zones/Biotech Parks / Leather Complex with homogeneous type of industries such as Items 4(d), 4(f), 5(e), 5(f), or those Industrial estates with pre –defined set of activities (not necessarily homogeneous, obtains prior environmental clearance, individual industries including proposed industrial housing within such estates /complexes will not be required to take prior environmental clearance, so long as the Terms and Conditions for the industrial estate/complex are complied with (Such estates/complexes must have a clearly identified management with the legal responsibility of ensuring adherence to the Terms and Conditions of prior environmental clearance, who may be held responsible for violation of the same throughout the life of the complex/estate).

APPENDIX - II

WQI calculation at the Project site for the ground water

			Ground water					
					project site			
parameter	Test-method	unit	standard permissible limit (Sn)	idel value (Vid)	Estimated value (Vn)	qn	wn	qnwn
pH	APHA 22nd Edition, 2510 B	mg/l	8.5	7	7.45	30.000	0.118	3.529
Electrical Conductivity	APHA (22nd Edition)2012, 4500-H+ B	µS/cm	300	0	240	80.000	0.003	0.267
Total Dissolved Solids	APHA (22nd Edition)2012, 2540 C	mg/L	500	0	105	21.000	0.002	0.042
Total alkalinity as CaCO3	APHA (22nd Edition)2012, 2320 B	mg/L	200	0	68.32	34.160	0.005	0.171
Total Hardness as CaCO3	APHA (22nd Edition)2012, 2340 C	mg/L	200	0	78.23	39.115	0.005	0.196
Calcium	APHA (22nd Edition)2012, 3500 Ca B	mg/L	75	0	20.65	27.533	0.013	0.367
Magnesium		mg/L	30	0	6.49	21.633	0.033	0.721
Chlorides	APHA (22nd Edition)2012, 4500-Cl- B	mg/L	250	0	18.51	7.404	0.004	0.030
Nitrate	IS 3025 (P-34) 2003	mg/L	45	0	0.98	2.178	0.022	0.048
Sulphate	APHA (22nd Edition)2012, 4500 E	mg/L	200	0	8.23	4.115	0.005	0.021
							0.211	5.391
			wqi =	25.57				

ground water project site | G2-sunaparbat | G3 | G4 | G5 | G6 | G7 | G8 | project site surface water | SW2 | SW3

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