International Journal of Advance Research in Engineering, Science & Technology(IJAREST),
ISSN(O):2393-9877, ISSN(P): 2394-2444,
Volume 2,Issue 5, May- 2015, Impact Factor:2.125

IDENTIFICATION AND ASSESSMENT OF IMPACT: A CASE STUDY OF A CHEMICAL INDUSTRY

[1] Pradnya Tikhe, [2] Dr. C.B. Upasani, [3] Mrs. Reshma Patel

1. *Student of M. E (Environmental Engineering), Birla Vishvakarma Mahavidyalaya, V.V. Nagar, Anand (India), pradnya.tikhe612@gmail.com*
2. *Director, Jyoti Om Chemical Research Centre, info@jyotiom.com*
3. *Asso. Prof of Civil Engineering, Birla Vishvakarma Mahavidyalaya, V.V. Nagar, Anand (India), rlpatel@bvmengineering.ac.in*

Abstract

Environmental Impact Assessment provides a unique opportunity and visualizes the ways by which the environment may be improved as a part of development process. The report has been prepared for a Chemical Unit. The unit proposes manufacturing of organic pigments. Impact Identification and prediction is a way of 'mapping' the environmental consequences of the significant aspects of the project and its alternatives. Several techniques and methodologies are in vogue for predicting anticipated impacts due to projects on natural and social aspects of the environment. These predictions are superimposed over the baseline (pre-project) status of the environment to derive the ultimate scenario of environmental conditions.

Keywords: *Environmental Impact Assessment (EIA); Impact assessment; Prediction*

I. INTRODUCTION

Environmental Impact Assessment (EIA) can broadly be defined as a study of the effects of a proposed project, plan or program on the environment. In other words, EIA is an administrative process that identifies the potential environmental effects of undertaking a proposal, and presents these environmental effects alongside the other advantages and disadvantages of the proposal to the decision-makers. Positive effects are maximized whereas adverse effects are minimized to greatest possible extent. EIA will provide a guideline to select and design the project, programme or plan with long term viability and therefore improve cost effectiveness. The main output of an EIA should be an action plan to be followed during implementation and after implementation during monitoring phase.

This report has been prepared for a Chemical Unit. The unit proposes manufacturing of organic pigments, Copper Phthalocyanine Green 7 (50 MT/Month) which is located near Vadodara, Gujarat. For establishing the unit, Environment Clearance is required. The products proposed by the unit fall in the Schedule attached to the EIA Notification, i.e. Project No. 5(f), Synthetic Organic Chemicals. Since the project will be established in industrial estate, it is classified as Category B project and will be evaluated by the State level committee.

Before preparing the report it is necessary to identify the impacts of the project upon the environment. This is possible by assessment and prediction of impacts. These predictions are superimposed over the baseline (pre-project) status of the environment to derive the ultimate scenario of environmental conditions. These Conditions are then subsequently evaluated for acceptability by screening them against standards. Based on results of prediction and evaluation, pollution abatement and control measures in order to mitigate the adverse impacts on the environment are delineated in an Environmental Management Plan for construction of the project activities, as well as for the operational phase.

II. METHODOLOGY

The overall environmental impact is divided into two categories.

- Construction Phase and
- Operation Phase.

The environmental impact assessment is accomplished by identification and prediction of impacts and their assessment. Potential impacts of the proposed project on the various environmental attributes given below are predicted;

- Air Environment
- Water Environment
- Land Environment
- Noise Environment
- Health & Safety
- Ecology
- Socio Economic Environment
- Aesthetics

The following project related activities identified as sources having potential to cause impact upon various environmental attributes

Construction Phase

- Site cleaning
- leveling and road laying
- Earthwork comprising of excavation, grading, trenching

- Transportation of construction materials
- Civil construction
- Mechanical erection
- Employment
- Greenbelt development

Operational Phase

- Transportation of raw materials and finished products
- Raw material and product storage & handling
- Manufacturing process & utility operations(consumption of resources & emission
- of liquid effluent, off-gases from stack, generation of Hazardous waste and Noise)
- Emergencies or disaster
- Breakdown of critical systems
- Employment
- Green Belt Development
- Infrastructure development and services

The identification of environmental impacts has been made, based on the understanding of cause-condition-effect relationship between an activity and the impact component. The activities identified as sources having potential to cause impact upon above stated environmental parameters due to proposed project during the construction &operation phase are given in Table below respectively.

Table 1. Identification of Impacts during Operational Phase

Activity/ Parameter	**Air**	**Water**	**Land**	**Noise**	**Ecology**	**Health and safety**	**Socio-Economic**
Raw Material and Product storing and handling	√	**x**	**x**	**x**	**x**	√	**X**
Transportation of raw materials and finished products	√	√	√	√	**x**	√	**X**
Production and utilities	√	√	√	√	**x**	√	**X**
Emergencies or disaster	√	√	√	√	√	√	**X**
Breakdown or critical systems	√	√	√	√	**x**	√	**X**
Employment	**x**	**x**	**x**	**x**	**x**	√	√
Greenbelt development	√	√	√	√	√	**x**	√
Infrastructure development and services	**x**	**x**	**x**	**x**	**x**	√	√

NOTE: (√) shows the possibility of impact and
(x) shows no impact will occur

Prediction of Environmental Impacts

Prediction of impacts involves determination of nature and extent of impacts due to the various activities to be involved in the proposed project. Generally, impacts are classified as follows.

- Positive or Negative
- Short term or Long term
- Direct or indirect
- Reversible or irreversible
- Quantifiable or non-quantifiable
- Acceptable or conditionally acceptable or unacceptable

The proposed project is for manufacturing activities and looking to the project site, magnitude of project and pollution potential, impacts have been predicted for following two classifications.

- Positive or Negative
- Short term or Long term

Based on Environmental Impact Analysis, the Environmental Impacts are quantitatively and qualitatively assessed. Prediction of impacts for the both construction & operation phase is given in Table below.

Table 2. Prediction of Impacts during Construction Phase

Activity/ Parameter	Air	Water	Land	Noise	Ecology	Health and safety	Socio-Economic
Site Cleaning	(-ve) ST	-	(-ve) ST	(-ve) ST	(-ve) ST	(-ve) ST	-
Levelling and road laying	(-ve) ST	-	-	(-ve) ST	-	(-ve) ST	-
Earthwork comprising of excavation, grading and trenching	(-ve) ST	-	(-ve) ST	(-ve) ST	-	(-ve) ST	-
Civil Construction	(-ve) ST	-	(-ve) ST	(-ve) ST	(-ve) ST	(-ve) ST	-
Mechanical erection	(-ve) ST	-	-	-	-	(-ve) ST	-
Employment	-	(-ve) ST	-	-	-	(-ve) ST	(-ve) ST
Greenbelt Development	(+ve) LT	(+ve) LT	(+ve) LT	(+ve) LT	(+ve) LT	(+ve) LT	(+ve) LT

Table 3. Prediction of Impacts during Operational Phase

Activity/ Parameter	Air	Water	Land	Noise	Ecology	Health and safety	Socio-Economic
Raw Material and Product storing and handling	(-ve) ST	-	-	-	-		-
Transportation of raw materials and finished products	(-ve) ST	(-ve) ST	(-ve) ST	(-ve) ST	-	(-ve) ST	-
Production and utilities	(-ve) LT	(-ve) LT	(-ve) LT	(-ve) LT	-	(-ve) LT	-
Emergencies or disaster	(-ve) ST	(-ve) ST	(-ve) ST	(-ve) ST	(-ve) ST	(-ve) LT	-
Breakdown or critical systems	(-ve) ST	(-ve) ST	(-ve) ST	(-ve) ST	-	(-ve) ST	-
Employment	-	-	-	-	-	(+ve) LT	(+ve) LT
Greenbelt development	(+ve) LT	(+ve) LT	(+ve) LT	(+ve) LT	(+ve) LT	-	(+ve) LT
Infrastructure development and services	-	-	-	-	-	(+ve) LT	(+ve) LT

Where (-ve): Negative Impact and (+ve): Positive Impact
ST: Short Term and LT: Long Term

III. RESULTS AND DISCUSSION

Prediction and assessment of impacts during construction phase of the proposed expansion activities are discussed above using Checklist method for prediction. There shall be no significant impact during the construction phase as no much construction will be required for the proposed project. The key problem anticipated would be increase in dust contamination and noise. However, these impacts would be for a limited period of time i.e. up to construction period only. For construction work, there will be no extraction of ground water. Also local labours will be employed and no accommodation for construction force will be created. There will not be any significant impact on surrounding ground water quality and quantity during construction phase. Dust will be generated during excavation and hauling operation and vehicle transportation on unpaved tracks at the site. Other exhaust gases like NO_x, SO_2, HCl and Cl_2 may be also slightly released into the local ambient air due to vehicular traffic movement. Thus, the local ambient air quality may be temporarily affected. It will be confined within the project boundary and expected to be negligible outside the plant boundaries.

There will be a beneficial impact on the local socio-economic environment as increase in demand for essential utilities and employment during both construction and operational phase. There will be a beneficial impact on the local infrastructure services e.g. roads, post and telegraph, communication, medical facilities, education and housing.

IV. CONCLUSION

During the environmental assessment study, all possible environmental aspects have been adequately addressed and necessary control measures have been suggested to meet with statutory requirement. The proposed project will contribute to economic growth in indirect way and may help in meeting the increasing demands of pigments if proved to be economically beneficial for future production. It can be concluded on positive note that after implementation of proper mitigation measures and environment management plan this project will have insignificant impact on environment and economic.

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