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Implementation of Environment Management System as per ISO 14001:2015 at Chemical Manufacturing Industry

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ABSTRACT

The Environment Management System (EMS) is a collection of procedures that allows a company to reduce its environmental effect while also increasing its operational efficiency. The requirements for an environmental management system are laid out in ISO 14001:2015. The aim of this work is to build and implement Environment Management System at the Chemical industry located at Dahej, Gujarat. The system's framework is based on "Plan, Do, Check, and Act" cycle of continuous improvement, which is the key to standard implementation success. The execution of the program is carried out by conducting various training related to document preparation, mock drill, and safety. After that, the pre-assessment audit called the internal audit is been carried out within the organization itself with the help of a third party i.e. consultancy. After successful completion of internal audit, external audit, and management review, the industry is certified for the Environment Management System. The next phase is to identify Environment Management system objectives and targets in order to align all the activities along with the preparation of EMS manual and department documents.

KEYWORDS: *EMS, ISO, Chemical Industry, Organization, standard, Management review, Audit, Environmental policies.*

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INTRODUCTION

The chemical industry is widely acknowledged as one of the most powerful sources of pollution in the environment. The principal influence of the chemical industry on the environment and lifestyle is pollution caused by industrial activity, which results in gaseous emissions, wastewater polluting natural ponds and subterranean water, and solid and slurry waste polluting the land and underground water if not cleaned [1].

An EMS is a set of guidelines for how a company should deal with environmental and social challenges. It is a critical component of long-term development for a more environmentally conscious future. Chemical manufacturing companies can benefit from the use of EMS as a management tool by reducing waste and the requirement for raw materials, as well as lowering their environmental effect. Compliance with environmental rules and pollution prevention are the primary objectives of an EMS [2].

Environmental management is addressed under the ISO 14000 series of standards. This relates to the organization's actions in the following areas [3]:

—to minimize the negative consequences of its activities on the environment,
—to constantly improve its environmental performance.

The International Organization for Standardization (ISO) established ISO 14001 as an international standard to outline environmental management system standards. In 2015, the standard was updated to include a continuous improvement survey as part of the development process to better understand the demands of current, former, and prospective users. The ISO 14001 management system standard is intended to lay out general requirements and concepts that, if implemented, should provide reasonable assurance that the system's outputs will have a minimal negative impact on the environment and will improve environmental performance [4].

The ISO 14001 standard is based on the PDCA (plan-do-check-act) improvement model, which is an iterative process that must be followed on a regular basis to ensure that results are achieved and the standard is followed.

Plan: In accordance with the organization's environmental policy, define the environmental objectives and methods required to attain the intended results.
Do: Execute the processes in the order that they were intended.
Check: Processes should be monitored and measured against the environmental policy's pledges, environmental objectives, and operating requirements, with the outcomes being reported.
Act: Steps to be taken for improvement on a regular basis.
At first, an Onsite assessment is done to determine the extent of compliance and gap. Gap Analysis is a process that allows an organization to determine how to achieve its goals. It compares the current state with actual goals and identifies what lacks during the implementation process for continual improvement. It helps in achieving target values specified by an organization for effective EMS. After estimating the effort and duration required for implementation, activity planning is done in the form of a bar chart.
The term "kick-off meeting" refers to the first meeting with top management as well as the establishment of the core team.
Following that, training for the core team is provided. At first, the introduction of ISO standard 14001 is given. It tells about requirements, resources, compliance obligations needed for implementing EMS. It is significant because this International Standard enables core team members to link their environment management system with the requirements of other management systems using a common strategy and risk-based thinking. Development of a management system manual based on the organization's standard and specific requirements. An EMS manual is a combination of various documents that define the goals of the organization for carrying out the processes within the environmental management system (EMS). It helps in understanding terms related to EMS. Development of mandatory system procedures, as well as making the core staff aware of them. In conjunction with relevant department personnel, develop function-level documentation. Documentation distribution and implementation.
After implementation of the system, internal audit training is given to the core team and an internal audit is executed. Following the completion of an internal audit, a management review is done to monitor the audit's results. Witnessing an external certification audit and assisting with NC closure i.e. Non-Conformity raised during an external audit, if any.
The organization must establish the environmental components about its activities, goods, and services that can be controlled and influenced, as well as their related environmental impacts, within the defined scope of the environmental management system. The organization must consider the following factors when determining environmental aspects:
a) Change, such as new or planned developments, activities, products such as machinery, instruments, or chemicals used, and services;
b) Abnormal conditions and reasonably likely emergency situations.

Table 1: Environment Aspect Impact Document

No	Activity	Env. Aspect	N/ AB/ E	Env. Risk	Impact Assessment				Total
					S	Se	P	D	
1	Chemical handling	Spillage of chemical	AB	LP	1	2	3	1	7
		Generation of fume	N	AP	2	2	3	3	10

Here, **N**= Normal activity; **AB**- Abnormal; **E**= Emergency; **S**= Scale; **Se**= Severity; **P**= Probability; **D**= Duration; **LP**= Land Pollution; **AP**= Air Pollution.

Table 2: Waste Matrix Report

Waste Name	Consent Quantity (MT/Y)	Legal Obligation	Disposal Method	PPE Required, Manifest Required, Labeling, TREM Card
ETP Waste	4800	HWR 2016	Secured Landfill Site	Yes Yes Yes Yes
Distillation Residue	4200	HWR 2016	CHWIF	Yes Yes Yes Yes

Here, **HWR**= Hazardous Waste Rule; **CHWIF**=Common Hazardous Waste Incineration Facility; **TREM Card**= Transfer Emergency Card

Table 3: Onsite Emergency Plan Observations Report

OEP Observations
Manufacturing process indicated as formulation and packing of herbicides. Kindly confirm your 4 products are under herbicides.
Maximum number of workers data to be updated.
Shift wise name & contact number of the person to be mentioned for correctness.

The total value for the defined criteria is Scale + Severity + Probability + Duration is 16. All these four defined criteria are given a number out of 4 according to the increase in severity. The organization itself defines the value for specifying significant aspects. In the chemical industry which I have studied, this value is 10. If the value is more than 10 then it will be considered as a significant environmental aspect.
Waste Matrix Plan is a record that contains the record of waste generated within an organization. It includes waste name, its consent quantity, unit of measurement, waste category number, source of generation or department, disposal method, PPE requirement, and Manifest requirement for handling. It also defines the applicable legal obligation for a specific waste category like ETP waste under Hazardous Waste Rules, 2016, etc [5].
This Onsite Emergency Control Plan (OECP) explains the plant's code of conduct as well as the actions to be taken in the event of an emergency. This plan lays out the groundwork for employees and others. It not only defines responsibilities, but also provides information on timely rescue operations, evacuations, rehabilitation, coordination, and communication. The above mentioned are some deviations during OEP (Onsite emergency plan) [6].

CONCLUSION

Emphasis was on environmental policy, legal requirements, and Emergency preparedness that made it easy to implement the system. During the Gap audit, many gaps were identified which were fulfilled by the time of the internal audit. The significant aspects and impacts identified during the internal audit were managed before the external audit. EMS was provided with ISO 14001 certification. Compliance of all Legal Obligations applicable to the given case company was successfully completed & it was certified for the same.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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