Environmental Audit

An environmental audit is an effective way of discovering the impacts and risks of your business on the environment, meeting legislative compliance, and finding out opportunities to improve your environmental performance."

This audit is a systematic, documented, periodic and objective review by a regulated entity of facility operations and practices related to meeting the environmental requirements. Environment audit should be undertaken by observing, measuring, recording the data and collecting and analyzing the various components in an Organization related to the environment. To be effective, it must be done systematically and thoroughly together with full management support.

Importance of Environmental Audits in the Industrial Sector:

In the present time, the pollution is significantly increasing day-by-day due to the industries and factories. It is causing serious health problems to the human being and also polluting the environment. It can also make an adverse effect on the mental, social, and economic ability of the person. It becomes imperative to save the people from dangerous chemicals and waste of the industries because people have to live in the green environment to lead a healthy life. It is important for the government to regulate rules and regulations for the industries to make the environment neat and clean. For this purpose, there is a strict need to employ environmental inspectors who can perform environmental audits to prevent the pollution. An environmental auditor can examine the activities carried out by the industries and business organizations and make them aware to about the modern cleaning technology.

Environmental audits are necessary to evaluate the impact of industries and their manufacturing on the natural resources. The environmental auditing is an important process to make sure continuous development in the environmental management. The environmental auditor appropriately monitors the system for safe disposal of waste in the industries to ensure the safety of the natural resources. It also lessens the interference of the government directly since the environmental auditor can examine the required standards and present the report to the government.

A good environmental auditing system needs a constant effort to monitor and analyze the industrial working system to create the analysis on pollution being generated. The major objective of performing **environmental audits** is controlling the pollution. It also helps in improving the production safety and to making sure the prevention and reduction of the chemical waste. It also provides performance reviews of industrial working facilities and its possible impact on the surroundings.

The environmental auditor is a responsible profession, and it needs full dedication towards protecting the environment. To become an environmental auditor, an individual needs to get a degree in environmental science or environmental management. You can also choose to get a master degree in environmental science from a recognized college or university. Being an environmental auditor, you have to take the responsibility to evaluate the environmental performance of operations in the businesses and industries.

The environmental auditor has to detect the existing environmental compliance problems and make recommendations to the manufacturers for reducing the pollution to save the environment. An auditor prepares the final audit reports which consist of results and recommendations for improvement. To become an environmental auditor you should also need to get certification from the Environmental Protection Agency you need to provide the demonstration that you are experienced in this field.

As a certified environmental auditor, you can deliver your services for the environmental consulting firms, banking industry, pollution board and departments, industrial companies, non-profit organizations, and municipal government agencies. By becoming an environmental auditor, you can serve your nation and save the environment from the hazardous waste and pollution and also aware the community to go green.

The Objective of Environmental Auditing

The essential objective of conducting Environmental Audits by companies is for assisting in providing protection against harm to the environment along with reducing health risk factors for humans. It is a type of Risk Management Tool with the key objectives being -

- Determining the performance analysis of available Environmental Management Systems.
- Verifying the compliance measures of being in accordance with the relevant Laws and Regulations.
- Reducing exposing humans to potential risk factors for any environmental, health or safety measures.

Types of Pollution Applicable for Environmental Auditing

The following list stated below mentions the types of waste or industries that generate pollution, which is covered under Environmental Auditing -

- Energy
- Waste Management
- E–Waste
- Plastic Waste
- Hazardous Waste
- Bio–Medical Waste
- Air & Water
- Carbon dioxide and other emission
- Food Sector
- Chemical Sector
- Pharmaceutical
- Automobile
- Composting

Environmental Management Plan (EMP)

Environmental protection planning is an important component of overall planning and implementation of eco-friendly and green campus of an organization. It is addressing issues ranging from human health and sanitation to various stakeholders of an organization and protection of plants, animals and microorganisms including wildlife habitats(Ghaffarianhoseini et al., 2016). Environmental Management Plan (EMP) is an important integration document between the various approvals, authorizations and specific components and/ or activities that are carried out in the campus without harming the environment. EMPis committed to manage its assets with its core values to protect the health and safety of people and the environment and to comply with Environment Health and Safety laws, regulations and Health and Safety standards. A clean environment is important for the

success of an organization to save for the future generations to ensure in safe use of air, land, and water resources. The management of an organization should endeavor to continually improve our environmental performance and to prevent the environmental pollution. All the stakeholders of the organization are expected to support our environmental goals while providing clean and environment friendly work culture. The main purpose of the EMP is to outline environmental protection measures to be followed during the organization development and to ensure that commitments to minimize environmental effects are met. The EMP should provide a reference document as per the legislative requirements for personnel when planning and/or conducting specific activities in the campus surroundings. In line with the Environment Policy, impact on the physical, chemical and biological environment should be determined along with statutory requirements and other environmental commitments.

Environmental Management Plan and Execution in the Organization sites

S.No.	Monitoring areas	Parameters Monitored	Monitoring frequency	Reason for monitoring parameters
1.	Dredging	Erosion, landscape, sedimentation, vegetation, disposal of dredging	Continuous	Dredging results in disturbance of Benthic community and causes soil erosion and sedimentation
2.	Marine Ecology	Biodiversity survey and conservation	Continuous	Unmitigated operations may result in loss of biodiversity as per the Indian Biodiversity Act
3.	Vegetation (Flora and Fauna)	Survey of macro and micro plants, animals (mammals, birds, moths, houseflies, reptiles, amphibians, termites) and soil and air microbial	Continuous	Conservation of macroand micro plant, animals (mammals, birds, moths, houseflies, reptiles, amphibians, termites) and soild and air microbial biodiversity

		biodiversity		conservation for future

				generations through modern technology
4.	Air Emission	O_2, CO, CO_2, SO_2, NO_2 level in the open, car parking and indoor areas	Monthly monitoring	Unmitigated operations may result in deterioration of air quality
5.	Solid Waste	Solid waste quality and quantity, solid waste disposal, reuse, solid waste treatment	Monthly monitoring	Compliance of Environmental Laws and Legislative policy
6.	Waste water	Primary, secondary and tertiary pollutants and their recycling, waste water minimization, storage and handling, reuse, treatment before disposal	Monthly monitoring	Minimize the water pollution and to provide quality water as per the Central Pollution Board
7.	Soil	Soil contamination, soil edaphic parameters, soil, gravel and sand composition, water holding capacity, soil erosion	Half yearly	Soil surface and water pollution cause diseases as per the Compliance of Environmental Laws and Legislative policy
8.	Noise	Noise intensity, causes and impact, remedies, standard operating procedure	Monthly monitoring	Uncontrolled noise cause nuisance which affect the health
9.	Occupational Safety & Health	Safety, health and welfare of people at occupation, measures taken, Firesafety, First aid box,Safety	Continuous	Department of Occupational Safety & Health

		protocol, Hospital facility		
10.	Land reclamation	Soil quality, soil micro and macro elements, soil composition	Half yearly	Legal obligation and structure protection, prevention of soil erosion and sedimentation to the port
11.	Restoration of the sites	Forest vegetation, plant vegetation, visual analysis, Photographic records	Continuous	Maintain the soil fertility and soil original reclamation

Aims and Objectives of Environment Audit

The important goal of an Environment audit is to promote the environment management and conservation for future generations. The reason for the environmental audit is to perceive, quantify, describe and prioritize the framework of environment sustainability in compliance with the applicable rules, regulations and requirements. In general, Environment audit can be achieved by creating awareness on the importance of safeguarding the environment among students, faculties and staff members, including public domain. An environmental audit programme is conventionally designed and implemented properly which can enhance an industry's environmental performance in a sustainable manner. It is useful to monitor the scale of optimum utilization of the resources and evaluating the company at National and International levels. The major goals of environment audit are:

a. To safeguard the environment and reduce the threats posed to human health by the Organization.
b. To create awareness among the stakeholders about the importance of environmental degradation and conservation as per the Environment Management Systems (ISO standard of 14001:2015) and Environmental Legislations by the Organization.
c. To establish a baseline information about the eco-friendly environment in the campusto the stakeholders for future sustainability.
d. To review the disposal of solid wastes and wastewaters in the campus and identify the sources of waste generation and possibilities of mitigation with respect to environmental compliance.

e. To conduct outreach programmes to the rural, tribal and urban community people on the environment damage and conservation.
f. To correlate the flora and fauna with environmental sustainability in the audit sites to provide a healthy atmosphere to the members of the Organization.
g. To take steps to minimize the environmental pollution and degradation by means of developing ‘Sanitation and hygiene policy’, ‘Water conservation policy’, ‘Waste management policy' and ‘Green campus and Environment policy’ by the Organization.
h. To ensuring the legislative compliances and to enable the waste management through reduction of waste generation, solid- waste and water recycling.
i. To create plastic free campus with the help of management and the stakeholders and to evolve health consciousness among the stakeholders.
j. To suggest for using alternative energy for the conservation of energy resources.
k. To evaluate the wastewater quality and determination of wastewater characteristics & their effects on the living system.
l. To classify the categories of solid waste hazardous waste their sources, quantities & characteristics with respect to the nature of environmental hazards.
m. To introduce and implement the time saving technologies in production as well as providing eco-friendly ambience in an organization following the latest IT based techniques and to minimize the wastes through modern cleaner technologies.
n. To maintains of Labour / Occupational health & medicine followed by proper documentation of environmental compliance status.
o. Regular environmental auditing once in a year will help in producing environmentally educated & technically sound personals.

Key elements of Environmental auditing:

1. Research the Audit Area

It is essential to understand the business process or function to be audited. If not familiar with it, thoroughly research the process or function to fully understand the subject matter. Review internal procedures, search the internet for resources, and seek help from subject matter experts.

2. Maintain Open Communications Throughout the Planning Process

The sooner the audit team reaches out to the auditee, the better. There is a certain amount of trepidation involved in any audit. Working with an auditee prior to the audit helps ease concerns the auditee may have. Communicating in person is always preferable. If this is not possible, telephone calls are the next best thing. Avoid communicating by email if possible.

3. Conduct Process Walk-Throughs

Armed with a working understanding of the process or function, conduct a face-to-face walk through with the auditee. Identify key business objectives, methods employed to meet objectives, and applicable rules or regulations. A walkthrough may include a tour of facilities. You may gather background information relative to the nature, purpose, volume, size, or complexity of automated systems, processes, or organizational structure. You might scan documents or records for general condition. All these activities provide opportunities to interface with the auditee and build rapport before the formal entrance conference.

4. Map Risks to the Organization, Process, or Function

Ask the auditee what his concerns are, what "keeps him up at night." Through research and interviews, identify risks to meeting business objectives and controls employed to mitigate those risks. Rate risks with the auditee based on probability of occurrence and potential impact. Consider control design, gaps, or mitigating factors to determine if the control system effectively mitigates risks.

5. Obtain Data Prior to Fieldwork

This has become a principal focus for us recently. We emphasize data in our initial requests for information. We perform data analytics before we begin field work. Identifying anomalies to confirm a condition or weakness early helps us target testing and optimize sample selections

What are the types of environmental audits?

- **Environmental Compliance Audit (External)**-This is the most comprehensive type of environmental audit, as it entails a review of the construction site or company's legal compliance status. It is also the most common of the two types of audits.
- **Environmental Management Audit (Internal)**- Internal audits are conducted by the organization or management in order to understand how it is meeting its own environmental performance expectations.
- **Functional environmental audit** – focuses on one element or impact of a particular activity, such as wastewater management audits, materials, and air quality monitoring.

Benefits of Environmental audits:

- Provide management with information about the management and performance of the company's environment as input for making decisions,
- Identify risks related to environmental responsibility and take action to implement them,
- Ensure company operations comply with environmental laws and requirements and, if not, take necessary corrective actions,

- Identify environmental management system weaknesses before they cause problems,
- Develop organizational culture and increase environmental awareness among people within the company,
- Identify opportunities for improvement in environmental management and performance to drive increased efficiency and cost savings,
- Improve company transparency to stakeholders such as government, customers, and investors to support long term good relationships with them,
- Encourage positive publicity by publishing audit results, thereby enhancing the reputation and image of the company, and
- Develop marketing strategies and strengthen brand equity, encourage consumers to remain loyal to the company.

Limitations of an environmental audit?

While contributing to supporting environmental sustainability, there are some limitations to environmental audit, including:

- Audits can be time-consuming and expensive to perform and are therefore not suitable for small businesses with limited financial resources.
- Companies may simply take advantage of positive publicity without actually intending to be environmentally responsible.
- Internal audits can be biased and lead to a consistently good environmental record, but this is not the case

Steps involved in the Process of Environmental Audit

Step #1: Opening meeting among the audit team and auditees, discussed about the audit procedure and document verification.

Step #2: Visited the on-site of the audit along with the audit team and auditees.

Step #3: Walked around campus to check the facility as walk-through audit and took photographs for preparing the audit report.

Step #4: Monitor the components as per the environmental audit checklist (Sanitation and hygiene, water conservation, waste management and green campus and environment policies).

Step #5: Noted down what all components are present and what are all not available in thecampus as of environmental audit components listed by NSF ISO- EMS checklist.

Step #6: Identified the issues in the campus with respect to the environmental compliance and strengths and weaknesses of the Auditee's Management controls and risks associated with the audit.

Step #7: Looked into other items to be monitored as per the NSF checklist with respect to Ecology and Environment studies.

Step #8: Exit meeting held after the audit in which the audit findings with the members of the Organization was discussed.

Step #9: Prepared and distributed the findings as a Report and Certificate along with the recommendations including the best practices followed by the Auditee.

Step #10: Comparison between the last audit report with the present audit report in which the number of suggestions and recommendations were taken into consideration and rectified significantly by the Management.

Step #11: Observed the audit process undertaken by the certifying agency between the last audit and current audit processes, whether the same certifying agency has undertaken the audit process or not?.

Documents Needed for an Audit

Conducting an audit can be daunting, especially with all the documents required to create a comprehensive report. Companies generally need maps and floor plans of their facility to figure out where to perform the audit and how to do it. Additionally, companies may need to submit the following documents:

- Environmental compliance certificates
- Environmental permits
- All raw materials used in company procedures
- Environmental plans
- Employee training records

Coming up with all these documents is challenging enough. And considering that gathering the documents is only the start of the audit, modern companies need to incorporate different tools to make it much easier to conduct these audits.

One of these tools is SafetyCulture (formerly iAuditor). This all-in-one auditing tool is made for modern companies and comes with features that can simplify gathering documents and conducting audits for the team.

Phases of Environmental Audit

Conducting an environmental audit doesn't have to be complicated. To paint a clearer picture of the process of conducting one within a company, it's best to divide it into three phases:

- Pre-audit phase
- Audit phase
- Post-audit phase

Pre-Audit

- The auditor will determine which environmental laws, policies, and procedures are applicable to the operations of the business, as well as determine the scope and objectives of the audit. The auditor must establish the criteria against which the audit will be conducted. Common criteria are company policies and procedures on environmental issues, applicable legislation and regulations, and **best environmental management practices**.

Pre-audit involves the following components:

- ✓ Planning the environmental audit
- ✓ Selecting the audit team based on experience and expertise
- ✓ Scheduling the audit facility and venue of audit
- ✓ Scrutinizing the audit application and checklist
- ✓ Opening meeting between audit team and auditee
- ✓ Acquiring the background information of the organization
- ✓ Visiting the site of audit by the audit team and coordinators
- ✓ Audit programme and briefing
- ✓ Collection of data and documents verification
- ✓ Discussion with the auditee for data verification

On-site Audit

- The auditor will conduct an assessment to determine whether the business is complying with the applicable environmental regulations, policies, and procedures.
- The auditor must develop an understanding of the controls that are in place, including formal procedures and practices, record-keeping and monitoring, inspection programs, and physical controls for containing pollution and spills. Through testing, observation, or inquiry, the auditor will attempt to verify whether the controls work as intended. All information gathered is recorded and evaluated. Potential problems noticed on-site are discussed with the management team or contractors.

During the audit, the following components are involved:

- ✓ Understanding the scope of audit
- ✓ Analysing the strength and weakness of the internal controls audit
- ✓ Conducting the on-site audit
- ✓ Evaluating the observations of audit programme
- ✓ Noting down the key observations and taking photographs
- ✓ Clarifications if required during the audit site and document verification

Post-Audit

- Following the on-site work, the next step is to prepare a report. The auditor will compile an Environmental Compliance Audit report which designates the status of the business as full compliance, partial compliance, or non-compliance. The report indicates the laws and policies the company follows and where the company is non-compliant. In the event of non-compliance, the report will provide advisory action to improve overall environmental legal compliance. The company has the option to request recommendations in the form of an action plan or not.
- Once an audit program is in place, future environmental compliance audits will refer to past reports to look for repeat non-compliance, as well as to measure what progress has been made in the implementation of prior recommendations.

Post-audit involves the following components:

- ✓ Identification of the best practices followed by the Organization
- ✓ Compiling a report of the data collected
- ✓ Distributing the report and certificate to the Organization
- ✓ Preparing an action plan to overcome the flaws
- ✓ Providing suggestions to implement the action plan
- ✓ Setting up the future environmental aims and objectives

Components of an Environmental Audit

Environmental audit has five components, namely:

1) Sanitation and hygiene policy
2) Green and Environment policy
3) Water conservation policy
4) Water management policy
5) Waste management policy
6) Rainwater harvesting policy

7) Environment conservation policy
8) Waste management initiatives
9) Environment management policy
10) Environment monitoring policy

Sanitation and Hygiene Policy

In this component, the following are being considered:

- Physical appearance and overall ambience
- Adequacy of toilets (Student/Employee: toilet ratio)
- Gender balance and disabled-friendly toilets (Male: Women)
- Water taps and sanitation plumbing, adequacy and efficiency
- Adequate clean drinking water facilities
- Kitchen staff apparel and hygiene
- Canteen and hostel hygiene maintenance
- Kitchen hygiene and fly proof condition
- Cutlery, crockery and utensils hygiene
- Dining hall hygiene and bad odour free
- Cleaning equipment and consumables

Water Conservation Policy

In this component, the following are being considered:

- Know the source of the campus water availability
- Monitor overhead tanks for periodical cleaning
- Reuse of treated water, recycling, leakages etc.
- Drip irrigation / sprinkler irrigation system for watering to plants
- Water efficient dispensing mechanism in campus

Rainwater Harvesting Policy

In this component, the following are being considered:

- Implementation of rainwater harvesting system
- Functioning status of rainwater harvesting system
- Connectivity between rainwater harvesting and open wells and bore wells

Waste Management Policy

In this component, the following are being considered:

- Is the campus a 'Plastic free zone'?
- What are the methods adopted for waste segregation and storage?
- Disposal of solid wastes, reuse and recycling process
- Vermicompost, cow dung and organic manure units
- Availability of Biogas plant and its implementation status
- Installation of incinerators and their functioning status
- Adequate number of waste bins, separate bins for dry and wet wastes
- Food waste dumped status methods of disposal

Waste Management Initiatives

In this component, the following are being considered:

- Sign boards indicating energy / water conservation in respective places
- Awareness sign boards on usage of tobacco and tobacco free campus
- Awareness sign boards on plastic usage and plastic free campus
- Programmes related to waste segregation / waste disposal systems
- Sufficient ventilation facility
- Social responsible activities to rural, tribal and urban areas

A good environmental audit

- Defines sources, quantifies types of waste being generated
- Collates information on unit operations, raw material, products and water usage
- Highlights process inefficiencies and areas of poor management
- Helps in setting targets for waste reduction
- Permits the development of cost effective waste management strategies
- Raises awareness in the workforce regarding the benefits of waste reduction
- Helps to improve process efficiency
- Assess the quantity of water usage within the company.
- Find out various sources of organic and solid waste generation and mitigation possibilities.
- Document the waste disposal system
- Bring out a status report on environmental compliance.
- Waste minimization opportunities realized, that contributes to reduction in operating price.
- Increased worker cognizance of environmental standards and responsibilities.
- Improve employee relations and morale.
- Improve the image of organization and its good will.
- Maintenance of sustainable stage of improvement.

Case study

Observations of the Environment Audit

22.1. Plastics use and their impact on the environment

The Ministry of Environment, Forest and Climate Change, Government of India has notified the Plastic Waste Management Rules, 2016. A Central Pollution Control Board report indicated that the total annual plastic waste generation in India at a humungous is around 3.3 million metric tonnes per year for which the data were collected from 60 major cities in India. The country generates around 26,000 tonnes of plastic waste a day out

of which 60% of plastic produced is recycled. But the problem with plastic is that most of it isn't biodegradable. It doesn't rot, like paper or food, so instead it can hang around in the environment for hundreds of years. More than eight million tonnes of plastic enters the world's oceans each year and most of that escapes from land. It is observed that 96% of plastic wastes are collected and segregated by the respective urban bodies in which the recyclable plastic waste are sold to the recyclers and non-recyclable plastic waste are sent for co-incineration in cement plants. People should be asked to use reusable items and initiate models which allow up-cycling of waste items for better use. This will help reduce plastic waste from urban local bodies, as well as curb the value for waste among the citizens. Plastic waste management is very important, because plastic destroys food chains, only 9 percent of the total plastic waste in the world is recycled.

People use plastic bags and plastic ware items every dayto hold objects like meals, clothes, grocery and stationary items, which can be bought from shops. Generally, the plastic items are non- degradable in nature that lead to soil pollution and affect the soil health significantly (Lazarevic *et al*., 2010). Most of the plastic items are considered as solid waste. This has resulted in many damaging environmental effects inclusive of animal choking, pollution, blockage of channels, rivers and streams, and landscape disfigurement. According to the World Health Organization (WHO) report, plastic items take at least 400 years to decompose completely in the soil which illustrates the subsequent effects on the environment.

Plastic pollutants form a basis for damage to humans, animals and flora through toxic pollution. It can take masses or even heaps of years for plastic to break down so the environmental harm is lengthy-lasting. It impacts all organisms in the food chain from tiny species to big ones. There is a need to reduce the plastic use to effectively limit plastic waste in the campus (Eriksson *et al*., 2016).

Dr. N.G.P. Arts and Science College has taken sufficient attempts not to use plastics in the campus and displayed a slogan ‘Plastic free campus’ in places like canteen, hostel dining halls, seminar halls, corridors, etc. to the students, parents and public. The Dr. N.G.P. Arts and Science College Management insisted the people use eco-friendly bags made from organic materials like plant fibres which are easily decomposable in nature. These efforts are very much essential to keep the environment neat and clean to conserve nature.

22.2. Solid Waste Management Practices at Dr. N.G.P. Arts and Science College Campus

Solid waste control is a term that is used to consult the method of accumulating and treating solid wastes by following the method of eco- friendly manner. It also offers solutions for recycling objects that do not belong to garbage or trash. As lengthy as humans have been living in settlements and home regions, rubbish or solid waste has been a difficult task. In the solid waste management, the wastes are accrued from different parts and are disposed of based on degradability materials like paper and non- degradability materials like glasses, plastics and metals. Integrated Solid Waste Management (ISWM) is an activity that promotes prevention of waste, recycling, composting, and disposal. A powerful ISWM considers how to save, recycle, and manage stable waste in better methods that will protect the humans and the environment.

The Ministry of Environment, Forest and Climate Change, Government of India has notified the Solid Waste Management Rules, 2016. As per the rules, solid waste means solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste and other non-residential wastes, street sweepings, silt removed or collected from surface drains, horticulture waste, agriculture and dairy waste, treated bio-medical waste excluding industrial waste, bio-medical waste and e-waste, battery waste, radio-active waste generated in the area under the local authorities. As per the rules, the local bodies are responsible for the collection, treatment and disposal of solid wastes (Irwansyah, 2017, Irwansyah *et al*., 2017). The ‘Central Board of Solid Waste Management’ is the monitoring authority under the said rules and is responsible for granting authorization to local bodies for processing and disposal of solid waste.

Both degradable and non-degradable items are being collected from different

Department laboratories, canteens, cafeteria, stationary shops and hostels every day and based on the nature of degradability. In addition, dust bins are kept in different places across the campus to provide a dust free atmosphere to the stakeholders. The dust bins arelabelled properly for the indication of degradable and non-degradable items. These bio