

COURSE CODE:	Emt 423
COURSE TITLE:	Environmental Auditing
NUMBER OF UNITS:	2 Units
COURSE DURATION:	2 Hours Per Week

COURSE DETAILS:

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COURSE CONTENT:

Development and the environment; Meaning of Environmental audit (E.A); Elements of defective E.A; Critical factors required in conducting a meaningful E.A; objectives of E.A; benefits of E.A; types of E.A (corporate audit, liability audit, technical audit, company internal audit, product audit, energy audit, environmental management system audit, waste management and emission audit); scope and frequency of environmental audit regulatory framework; E.A process; steps in conducting E.A programme; stages of E.A process; characteristics of E.A programmes; environmental risk assessment and management.

COURSE REQUIREMENTS:

This is a compulsory course for all students in Department of Aquaculture & Fisheries Management. In view of this, students are expected to participate in all the course activities and have minimum of 75% attendance to be eligible to write the final examination.

READING LIST:

1. Michael, J.G. *Achieving Environmental Management Standards: A Step-by-Step Guide to BS 7750*. Pitman Publishing. London. 1997

2. Nigerian Society of Chemical Engineers. *Industrial Health, Safety and Environmental Management*. 2000.
3. David, R.T et al. *The EARA Register of Environmental Auditors*. Earth Scan Publications Ltd, London. 1995.
4. Ruth, H. *The Eco-Management and Audit Scheme, a Practical Guide*. Business and Environmental Practical Guide. 1994.

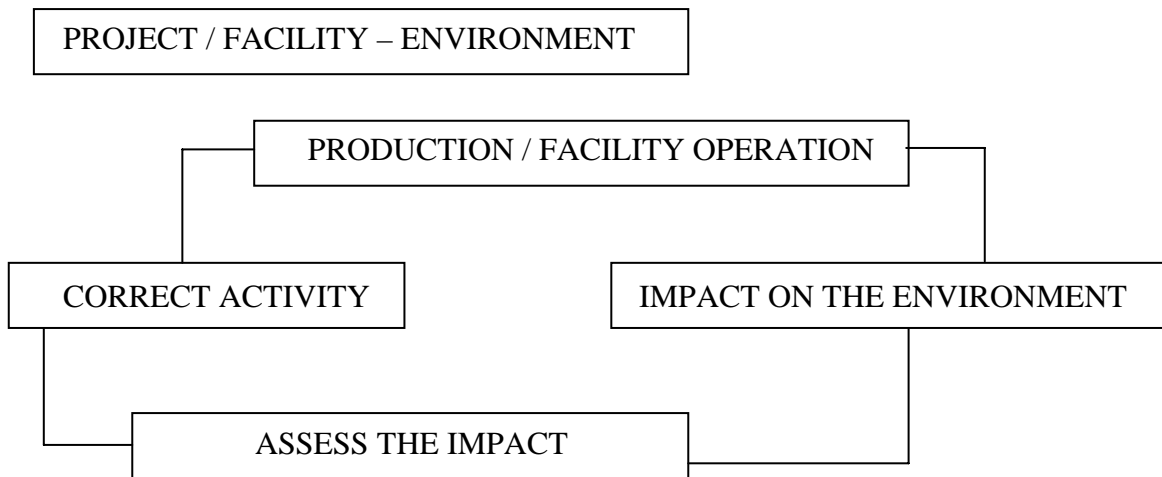
LECTURE NOTES

AN APPROACH TO ENVIRONMENTAL AUDITING

Introduction and Objectives of Environmental Auditing

In ETA parlance, environmental “audit” is usually referred to as an account of the environmental consequences of operational developments. That is “after-the-fact” evaluation (see Figure 1). The data set used for audits are derived from monitoring programmes, and are used to identify and evaluate the effects of a project on the human and natural environments.

Fig. 1: ENVIRONMENTAL AUDITING SCHEME



The major value of auditing is as a management tool, which provides timely information on environmental performance in relation to goals and objectives. Also auditing provides

independent verification that production/project systems are in place, to ensure continued compliance with the legislation(s) in force.

- i. Provides timely information on environmental performance in relation to goals and objectives.
- ii. Provides independent verification that project is in place to ensure continued compliance with the legislation in force.

A related advantage is reduced exposure to litigation and regulatory risk. Furthermore, environmental auditing has the following equally important benefits:

- Increasing awareness of environmental policies and responsibilities;
- Providing an opportunity for management to give credit for good environmental performance;
- Identifying potential cost savings, for example those which might arise from waste minimization;
- Providing an opportunity to determine the accuracy of E.I.A predictions earlier made;
- Providing an up-to-date environmental data base, which can be drawn on when making decisions in relation to plant/project modifications, etc. or for use in emergencies;
- Evaluating training programme and providing information for use in training staff.

Overview of the Approach

It must be emphasized that the requirements for environmental auditing could vary from one company/agency to another, depending on factors such as location, size, number, resources, type of employee and legislative requirements. Consequently, the basic principles and the general approach are common to all situations, the description of which follows:

- Developing an understanding of the plant's internal management systems and controls;
- Assessing the strengths and weaknesses of project;
- Gathering audit evidence through assessment and verification;
- Evaluating audit findings;
- Discussing findings with facility management;
- Preparing audit findings for the close out meeting;
- Preparing the draft audit report followed by the final version;
- Completing the action plan (by the audited facility); and
- Ensuring that the action plan has been implemented. This is accomplished by the Corporate Environmental Services Staff including the Manager regular and special visits to plant (see Figure 2)

Of vital importance to the audit process is the preparation of an audit process, response plans and the follow-up activities described in Figure 3.

The preparation and implementation of the action plan are essential for an effective audit programme.

Audit Types

International experience has shown the existence of about seven distinct types of environmental audit. These include the external environment, occupational health, industrial hygiene, emergency response, acquisition, divestiture and closure.

Audit Team

Under normal circumstances the audit team should consist of the following at the minimum:

- (a) A production/project manager or a site manager from a similar site (as Team Leader);
- (b) A qualified environmental health specialist (as experienced system Auditor and team Secretary);
- (c) An Environmental and Safety Manager either from within and/or a similar site;
- (d) A bio-chemical specialist;
- (e) An Environmental Engineer having special knowledge of the operations under consideration;
- (f) A Sociologist or Town Planner having special knowledge of the plant/project location and the citizenry.

Others e.g. FEPA staff or Staff from its state counterpart, could be invited to join the team, depending on available resources. It is quite important to invite experts from outside, to participate in the auditing process. This gives a good measure of legitimacy to the report thereafter produced.

CHAPTER TWO

TYPES OF ENVIRONMENTAL AUDITS

Environmental audits can be subdivided into various types according to the operations of the facility; the objectives of the audit; the requirements of the regulatory agencies and based on environmental performance gaps identified during inspections. Companies need to ensure they have carefully considered the scope of the audit (the systems to be evaluated) during the first phase of the auditing process, so as to ensure that every element required for effective audit is incorporated into the audit programme.

Systems to be checked can include corporate policy, systems analysis, operational procedures and practice, level of emissions, production of goods and waste, use and storage of energy and materials, transport systems, training procedures, facility maintenance and emergency procedures. The main types of environmental auditing are:

2.1. CORPORATE AUDIT

This type of audit specifically examines the efficiency and effectiveness of management in implementing corporate environmental policy of the company. According to BP environmental audit process, a corporate audit is essentially an audit of a division or unit authorized by the main board at the head office of the company. The corporate audit is mainly concerned with the organizational structure to ensure that the roles and responsibilities are understood by chief executives and to examine the organizational structure that deals with environmental programme management, line management responsibilities, technical and advisory support and the vertical and lateral communications, etc.

Typical corporate audit starts with interview of the chief executive, who is questioned on issues relating to policy, his understanding of it and the chief executive's view on how his

organization will implement the policy and its effectiveness. Other questions deal with communication awareness, issues relating to other company businesses, attitudes of divisions, staff and management to environmental matters, its customers and the public. Subsequently, line managers are interviewed followed by site visits of selected sample locations.

Information on site location is usually got from initial interviews of top management. While top management are primarily concerned with organization, policy implementation matters, awareness and communication channels, occasionally, site visits requires deeper investigation. In this way the strength and sense of urgency conveyed by management to the workforce and upward and downward efficiency of communication become apparent.

Corporate audits can involve looking at:

- A single site,
- A single company,
- An operating division,
- An environmental management system.

Specific audits within the operating divisions include:

- A purchasing audit, which analyses how the company sources and buys its raw materials and what impact the division has on the environment.
- A transport systems audit, which examines the effect of transportation system on the environment.

Classification of Corporate Audits

Issues Audit

Issues audit is concerned with how company deals with environmental issues of key concern.

Issues audit involves evaluation of policy, operating procedures and other guidelines set against

actual operating practice within all the sectors of the business. Issues audit is important as it tends to reassure concerned corporate head office management that operating business division or plants are themselves environmentally concerned and responsible in all aspects of their business activities.

Compliance Audit

Compliance auditors check whether a company is complying with environmental legislation, industry standards, environmental regulations of the host state under which it operates daily and the company's internal policy.

Activity Audit

This is another form of corporate audit that evaluates the implementation of corporate policy on company's activities which cross business boundaries. For example, an audit of shipping operations of a group of companies is an activity audit. This may involve an audit of all vessels including barges and supply vessels. Such audit is directed at the company's environmental policy for the operation of vessels and the organizational structure required for ensuring effective implementation.

The audit activity of the shipping operations mentioned above can involve interview with shipping crew members, jetty and deck crews, examination of ship operating instructions and procedures and environmental requirements of chartered vessels and those operated by contractors. Corporate audits are conducted in a corporate manner, not with punitive intentions or to police anybody but to investigate and assist people in doing their work in an environmentally friendly manner. Corporate audits reveal, to an extent, the organizational

weaknesses of the company that require correction. These weaknesses can arise from a number of reasons, which may include:

- Failure of management to understand the strength and intents of corporate policy;
- Lack of environmental awareness due to poor communications and insufficient knowledge of overall complexity of the issues;
- Changes of personnel and inadequate job descriptions which fail to pin-point environmental responsibility of individuals;
- Organizational inadequacy and unclear lines of responsibilities;
- Organizational evolutionary drift in which changes in organizational structure are made without reference to the original role of people prior to changes;
- Changes in company objectives or development phases;
- Inadequacy of environmental policy.

Sometimes, line management has insufficient knowledge of systems operating under them. It is also a common occurrence whereby communication downward are clearly defined but with no feedback loops enabling grassroots environmental problems from being communicated back upwards to appropriate top management. This may result in serious blockage in communication.

2.2. LIABILITY (PRE-ACQUISITION) AUDIT

This is used to assess the potential environmental liabilities of a property, when a client is seeking to purchase a site or a company or to merge with another. It is a useful tool for reassuring the purchaser that he is not buying environmental liabilities or problems of potential liabilities.

Liability audit involves the assessment of the environmental status of properties such as houses, land, industrial site, etc. before purchase. When a company is about to buy a site, it needs to check out the past use to which the site and buildings had been put into such as landfill site for toxic wastes, solid waste dump and burial ground or other contaminants and hazardous substances. The audits usually try to ascertain the level of contamination that the properties had suffered which may be a source of future environmental liabilities.

The value of a site will vary according to the presence or absence of any contamination, and once this is established, the purchase price may change to reflect the cost of clean-up and remediation. This type of audit is used as a pre-acquisition assessment activity when somebody is seeking to purchase a site or a company. They can also be used prior to corporate merge process between companies. Typical example of a liability audits is shown in figure 2.1.

The case study in Figure 2.1 shows how a liability audit on the divestiture of an oil business could be carried out. The focus would be on contamination problems such as cost of cleaning contaminated lands or underground water body remediation.

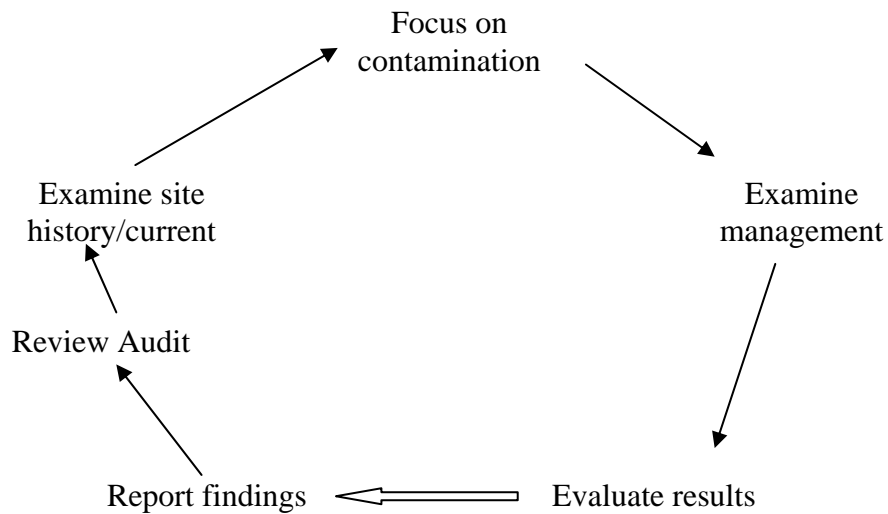


Figure 2.1: Case Study of Liability Audits of Oil Business

The auditor would need to look at site history, current usage and the past management practice in place. The better the management practice, the less likely the management would allow contamination of resources and the environment. Hence the management needs to be examined properly.

The liability audit looks at management structure, air, water and land pollution cases, waste disposal, material handling and storage and contingency plans to deal with accidents. The auditors will also look at construction works, land registry records, following previous ownership and try to establish what the site was used for previously. This will help determine probability of past contamination.

Spillage, use of underground tanks and types of chemicals used for production of goods need to be examined. The auditor can receive documentary evidence about the site. The auditor may be commissioned by either party involved in the sales of the property.

2.3. TECHNICAL AUDIT

Technical audit is carried out as a management tool to solve environmental and safety problems. Primarily, it is an in-house exercise but many companies use external consultants to introduce independent and objective check on their facilities or to train or supplement in-house staff expertise. With technical audit, company can look at its rate of compliance with environmental and safety legislations; internal, international and industry standards such as occupational safety standards, procedures, controls; and environmental management standards.

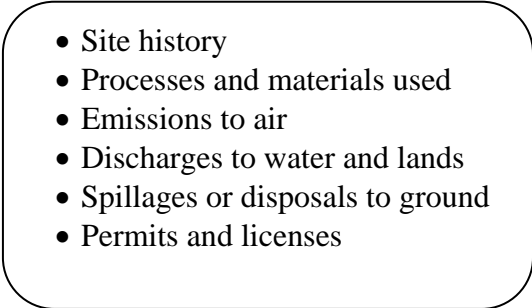
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- Site history
 - Processes and materials used
 - Emissions to air
 - Discharges to water and lands
 - Spillages or disposals to ground
 - Permits and licenses

Figure 2.2: Scope of Technical Audits

The purpose of technical audit is to measure the environmental and safety performance of the facility and to develop an action plan to put things right. The emphasis is more on emissions to air, discharges to water and permits involved. With technical audit, a company can look at its rate of compliance with environmental and safety legislation or with its own standards.

2.4. COMPANY INTERNAL AUDITS

Internal audit involves the review of environmental management systems, procedures and company environmental performance using in-house or industry criteria. The purpose of internal audit is to enable facility management obtain objective view of the facility's overall environmental performance so as to develop corrective action plan for improvement.

Internal audit reports are restricted to internal use by facility and line management. There are many performance elements in every internal audit, which must be assessed, including:

- Understanding of the policy implementation of the process;
- Regulations and compliance;
- Plant design and operation;
- Operating procedures and practices;
- Maintenance practices;
- Emergency response plans and contingency measures;
- Source and receiving environment monitoring;
- Incident reports and corrective action measures;
- Environmental training and awareness;
- Internal and external communication.

2.5. PRODUCT AUDIT

Product audit involves looking at the extraction, supply, production and distribution processes involved in the life of a product. This may include quality assessment of the whole system, and can look onward to the marketing of the product.

The most commonly used form of environmental audit for products is the life-cycle analysis or cradle to grave assessment. This is well established in several national product-labeling schemes like Canada (Environmental Choice), Japan (Eco-Mark) and the EC, Eco-label of which the UK is a member. Companies operating under the Eco-Environmental scheme standards can only display Eco-label if their products meet certain pre-determined environmental standards.

The scope of the product audit defines clearly the product type and range, the key environmental criteria to be considered, and the product's fitness for purpose. The product audit areas include:

- Raw Material: The sources of the materials, the potential effects and availability of alternative choice.
- Production process: Significant effects of products come from the production processes. Product audit considers what can be done to reduce energy use, pollution, waste and transport of environmental problems. It also determines available, best environmental options that can reduce cost of impacts.
- Utilization: The effects of products use and how it compares with others products.
- Disposal: This aspect considers the effect of disposal and determines reusability and recyclability of the product.

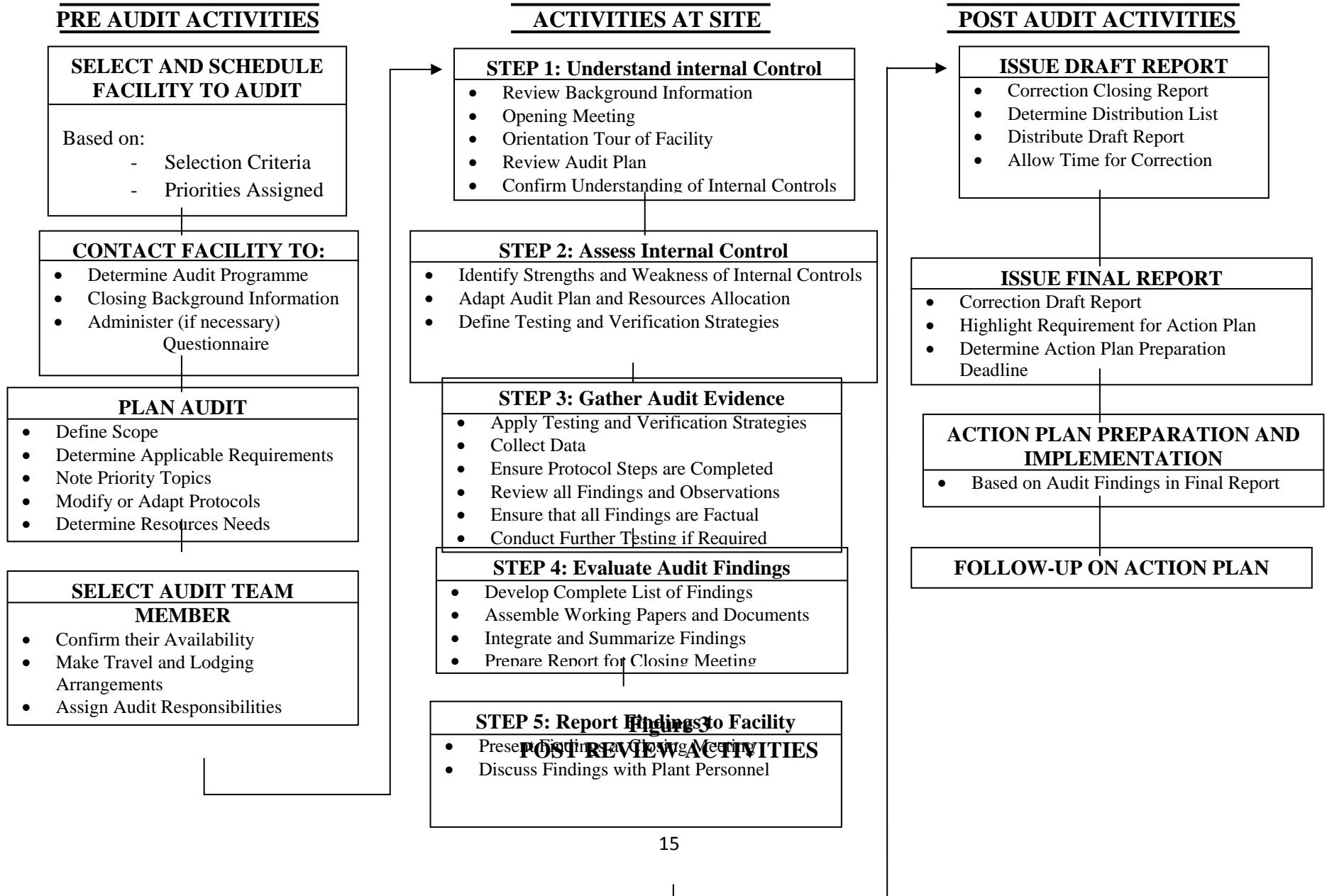
2.6. ENERGY AUDIT

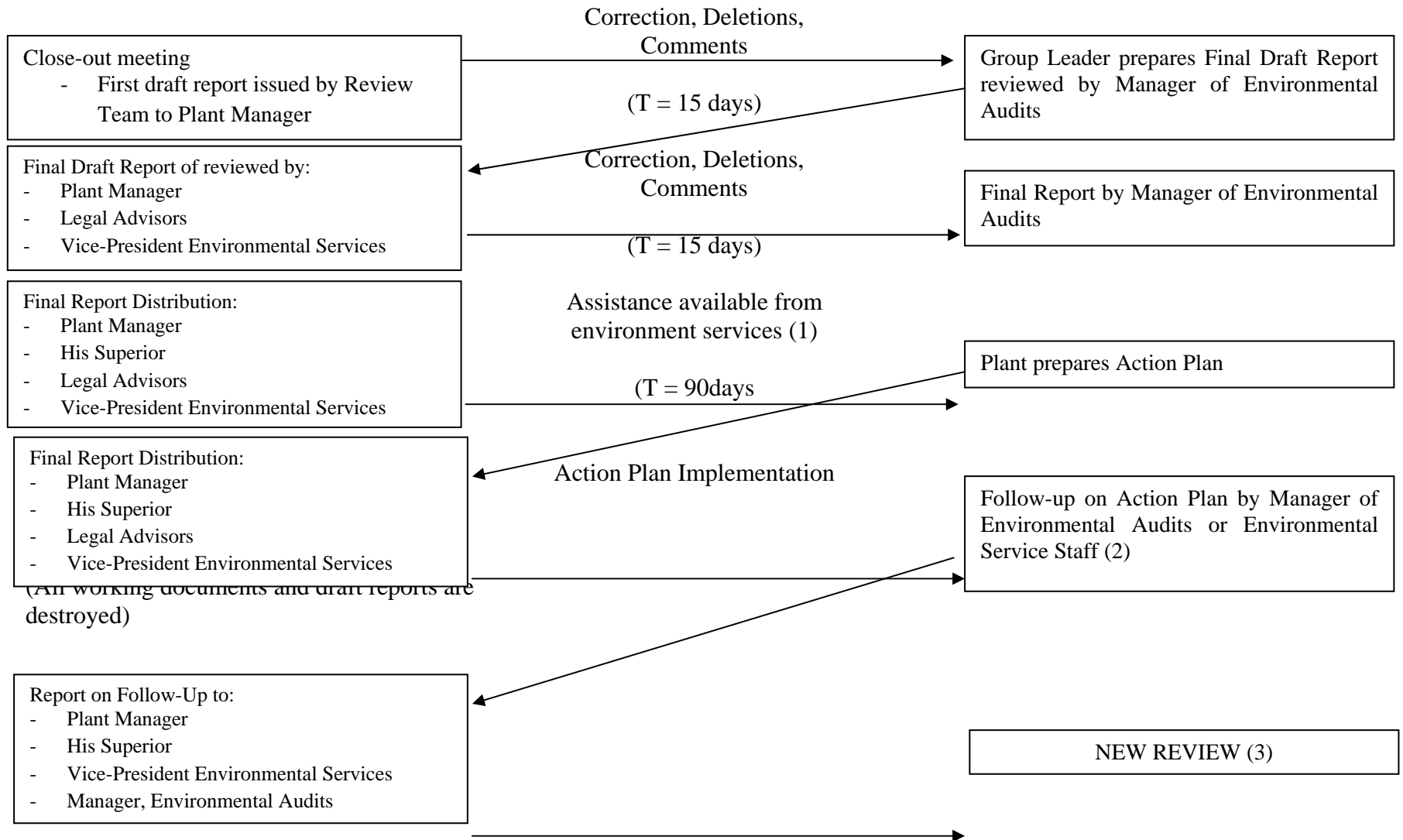
Energy audit involves the systematic assessment of energy inputs, outputs and general utilization of energy in the audited facility.

A detailed study of energy use can be used to reduce energy consumption by adopting a more efficient procedures and equipment. There is a double benefit to such a study. Not only can it be used to identify major cost savings areas to the company, it can also reduce a number of indirect environmental impacts ranging from transportation of fuel to the emission of CO₂, SO₂ and NO₂ from fuel use.

Like other audits, careful preparation, a rigorous methodology and effective follow-up remain the key elements to energy audit success. The audit should identify appropriate energy conservation measures.

Figure 2
BASIC STEPS OF AN ENVIRONMENTAL AUDIT





Scheduling of Audits

While there is no generally agreed time frame for audit scheduling, it is not out of place to suggest an audit exercise once in 3 -4 years. However, certain factors could lead to an increase in frequency of auditing. Such factors include

- new or modified legislation;
- the size of the facility;
- the processes carried out and the characteristics of the chemicals and raw materials used and the volumes stored.
- the employee exposure to in-plant chemicals and process by-products.
- the emission effluent and waste volumes and characteristics;
- the sensitivity of the environment surrounding the facility;
- the nature of the receiving environment; and
- the proximity of public residences to the plant.

Conclusion

As part of its mandate, the Federal Environmental Protection Agency has been carrying out some form of environmental audits of industrial establishments. It has been suggested by FEPA that auditing should be on schedules agreed to between it and the project management.