

PURPOSE,BENEFITS OF EMS & PDCA CYCLE

1. Purpose of an Environmental Management System

- To provide organizations with a framework to protect the environment and respond to changing environmental conditions in balance with socio-economic needs.

- It specifies requirements that enable an organization to achieve the intended outcomes it sets for its environmental management system.



PURPOSE,BENEFITS OF EMS & PDCA CYCLE

2. Benefits of Environmental Management System

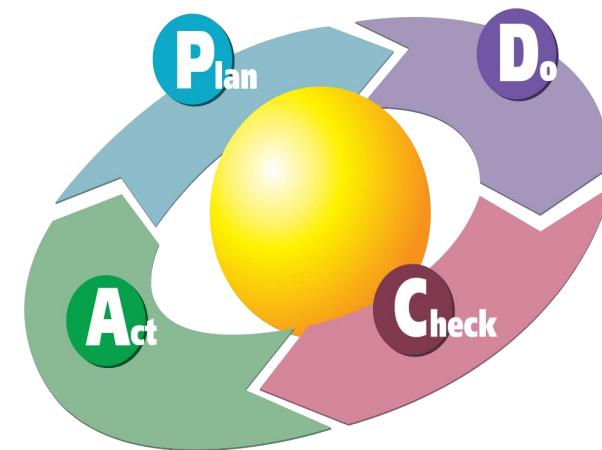
- Cost savings in waste, recycling and consumption
- Advantage over competitors when tendering for business
- Management of environmental risks
- Compliance with individual countries environmental regulations
- Demonstrates your commitment to improving the environment
- Shows you are a responsible future focused organisation
- Can reduce insurance cover costs
- Can increase employee engagement in the knowledge

PURPOSE,BENEFITS OF EMS & PDCA CYCLE

Environmental Management System

PDCA is an on going, iterative process that enables an organization to establish, implement and maintain its environmental policy and continual improves its environmental performance.

- a)Plan
- b)Do
- c)Check
- d)Act

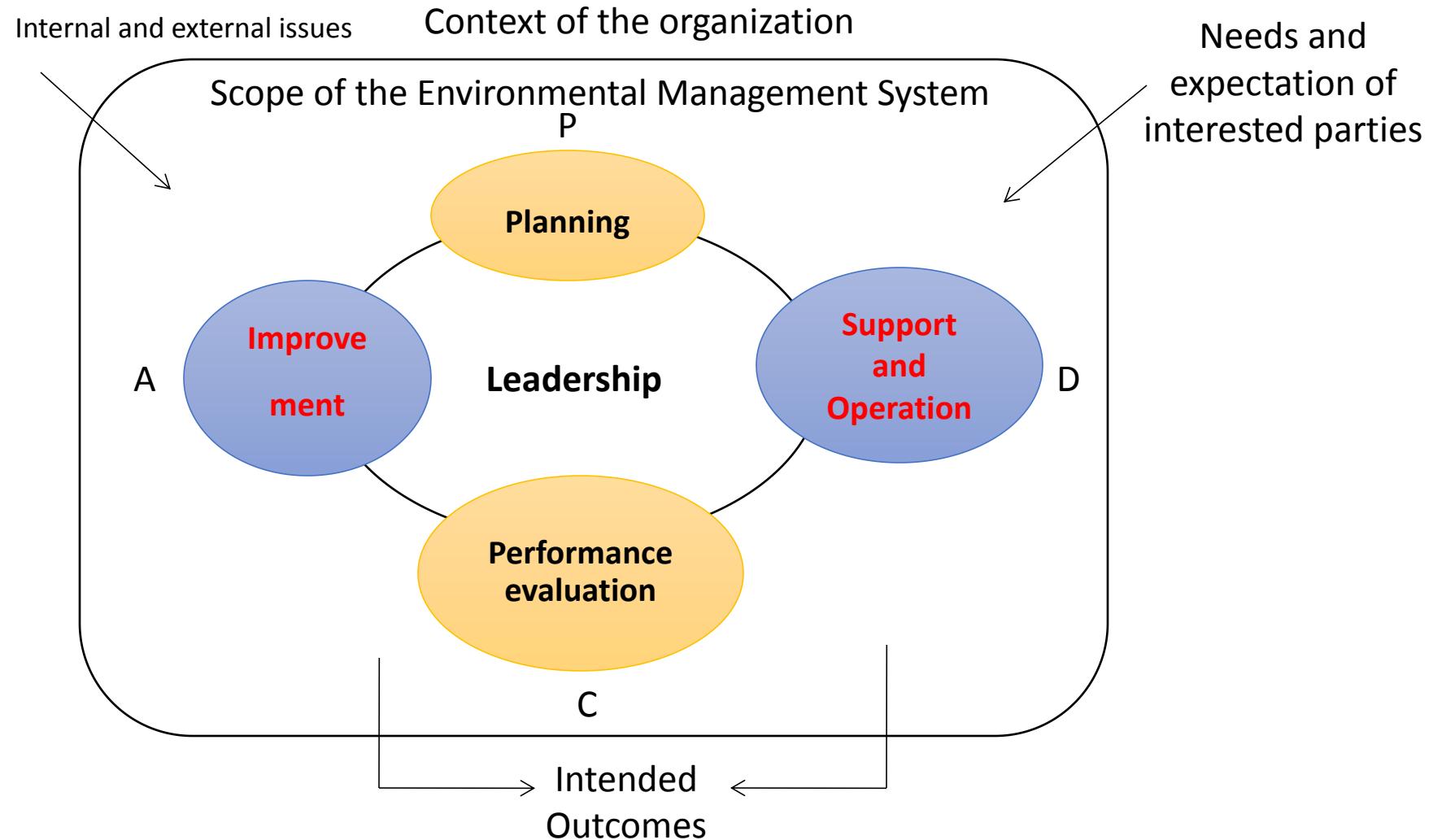


PURPOSE,BENEFITS OF EMS & PDCA CYCLE

Continual Improvement



PURPOSE,BENEFITS OF EMS & PDCA CYCLE



INTRODUCTION TO AUDITING

1. What is Audit?

Systematic, Independent and documented process for obtaining “audit evidence” and evaluating it objectively to determine the extent to which “audit criteria” are fulfilled.



INTRODUCTION TO AUDITING

Type of Audits



2. Internal or First Party Audit

- Companies to evaluate the effectiveness of their own Environmental Management System performance
- To identify deficiencies and inaccuracies within the system

INTRODUCTION TO AUDITING

3. External or Second Party Audit

The Second party audit is generally known as the vendor Environmental Management System assurance audit

Objectives

1. Qualification of vendors
2. Customer's requirement shall audit their vendors
3. Improve their Environmental Management system
4. Resolve Environmental problems / issues



INTRODUCTION TO AUDITING

4. External Third Party Audit

Third party audits are conducted by an independent body (certification body) and can either be voluntary, as in the case of a certification audit, or compulsory, as required by laws and regulations

5. Stage 1 Audit

To evaluate the Environmental system is in compliance with a standard

- ❖ Document review



INTRODUCTION TO AUDITING

6. Stage 2 Audit

To evaluate the implementation, including effectiveness, of the client's management system.

7. Follow-up Audit

Any major Non conformities require a follow up audit

8. Re-Certification Audit

The Re-Certification audit includes an onsite audit

- ❖ Verify the Full Management system
- ❖ Demonstrate commitment
- ❖ Enhance overall performance
- ❖ Achievement of the organization's policy and objectives

INTRODUCTION TO AUDITING

9. Additional Audits

- ❖ An additional full audit
- ❖ To verify effective correction and corrective actions

10. Surveillance Audit

- ❖ Surveillance audits are on-site audits
- ❖ Certified management system continues to fulfill requirements

11. Extensions to Scope

- ❖ May be conducted in conjunction with a surveillance audit

INTRODUCTION TO AUDITING

12. Short-notice Audits

- ❖ To investigate complaints
- ❖ In response to changes
- ❖ As follow up on suspended clients

13. Multi-site Audits

- ❖ Client's management system covering the same activity in various locations
- ❖ A sampling programme

INTRODUCTION TO AUDITING

14. Environmental Audits

- Environmental Management Audits
- Environmental Compliance Audits
- Environmental Assessment Audit
- Waste Audits
- Environmental Due Diligence Audits
- Supplier Audits

Benefits of Environmental Audits

INTRODUCTION TO AUDITING

15. Audit Terms and Definitions

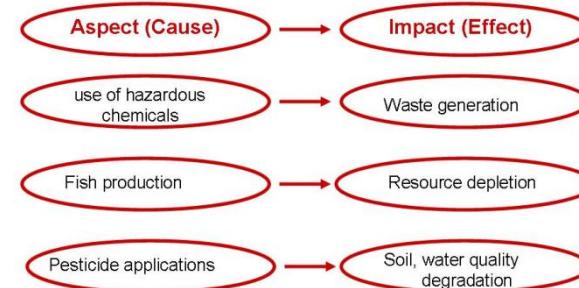
Terms and definitions

- Terms related to organization and leadership
 - ❖ Management system
 - ❖ Environmental management system
 - ❖ Environmental policy
 - ❖ Organization
 - ❖ Top management
 - ❖ Interested party



INTRODUCTION TO AUDITING

- Terms related to planning
 - ❖ Environment
 - ❖ Environmental aspect
 - ❖ Environmental condition
 - ❖ Environmental impact
 - ❖ Objective
 - ❖ Environmental objective



INTRODUCTION TO AUDITING

- Terms related to planning

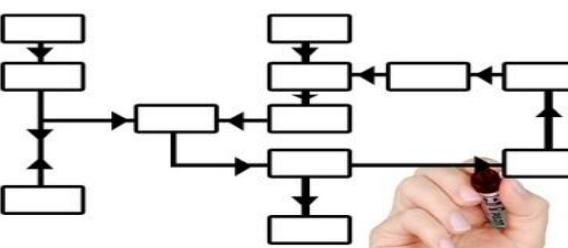
- ❖ Prevention of pollution
- ❖ Requirement
- ❖ Compliance obligations (preferred term)
- ❖ Risk
- ❖ Risks and opportunities



INTRODUCTION TO AUDITING

- Terms related to support and operation

- ❖ Competence
- ❖ Documented information
- ❖ Life cycle
- ❖ Outsource(Verb)
- ❖ Process



INTRODUCTION TO AUDITING

- Terms related to performance evaluation and improvement

- ❖ Audit
- ❖ Conformity
- ❖ Nonconformity
- ❖ Corrective action
- ❖ Continual improvement



INTRODUCTION TO AUDITING

- Terms related to performance evaluation and improvement
 - ❖ Effectiveness(Annex SL)
 - ❖ Indicator 
 - ❖ Monitoring
 - ❖ Measurement
 - ❖ Performance
 - ❖ Environmental performance



CERTIFICATION AND ACCREDITATION

Accreditation Body- Definition

Third-party attestation related to a conformity assessment body conveying formal demonstration of its competence to carry out specific conformity assessment tasks

The certification body will make its services accessible to all applicants based on the requirements of the applicant client

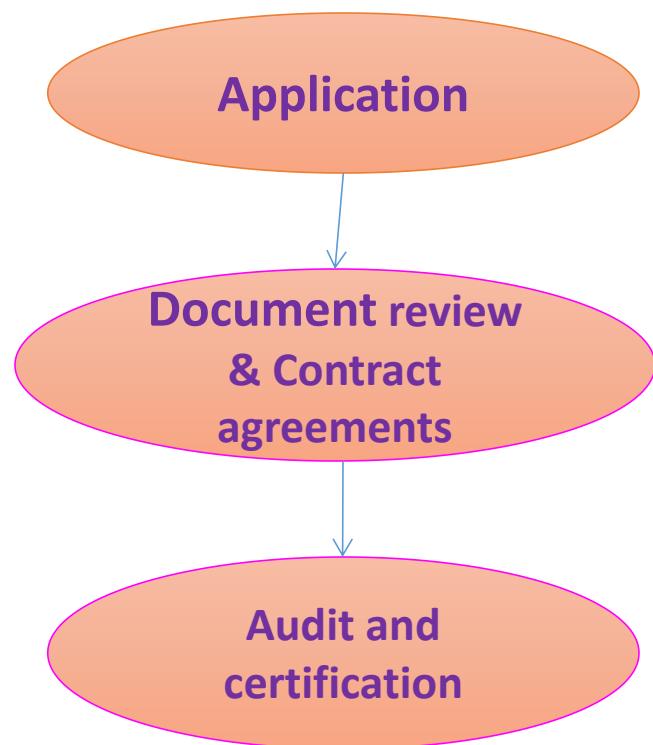
Certification Body

The certification body will certify the clients on different standards make its services accessible to all applicants based on the requirements of the applicant client

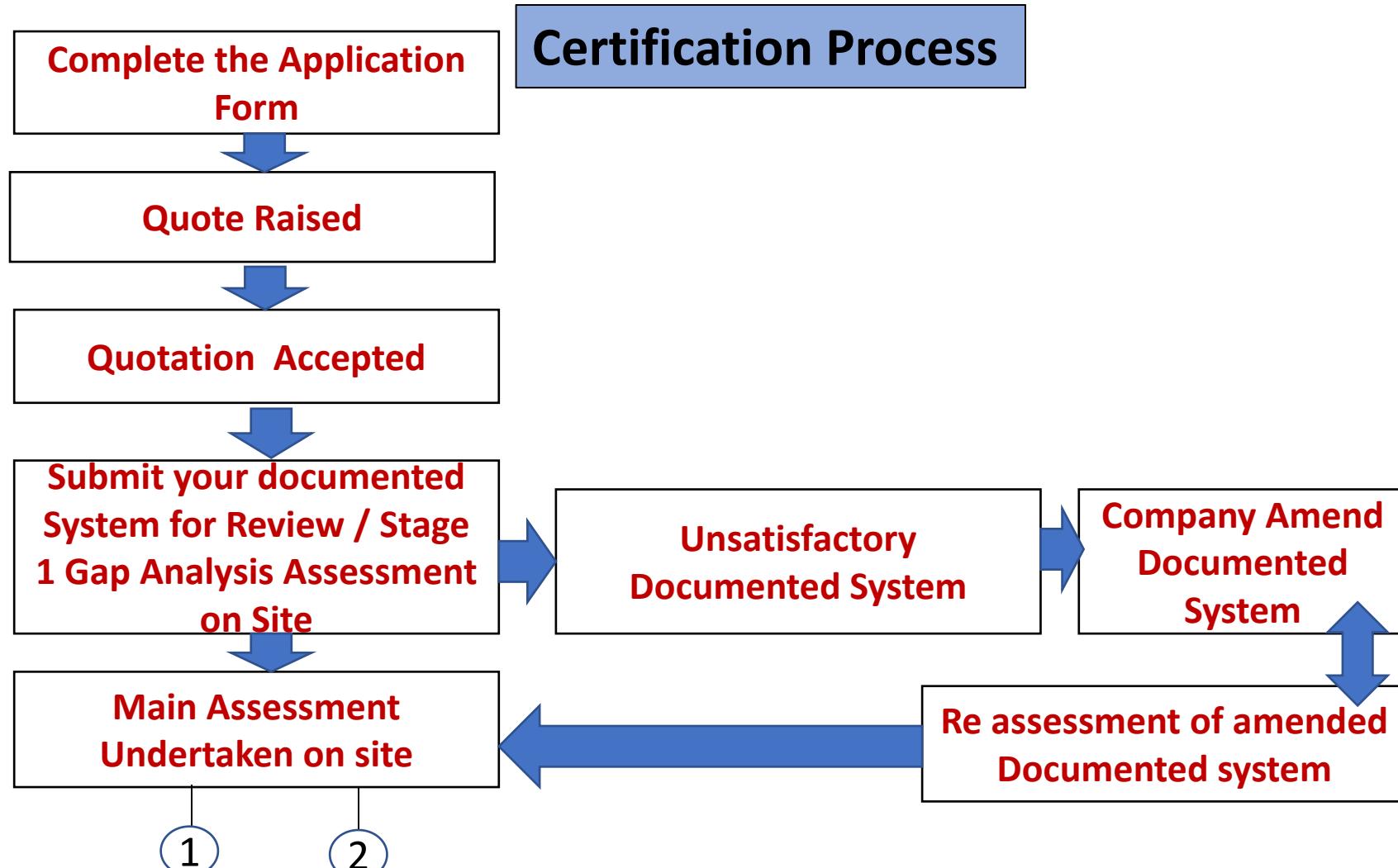
CERTIFICATION AND ACCREDITATION

Certification Process

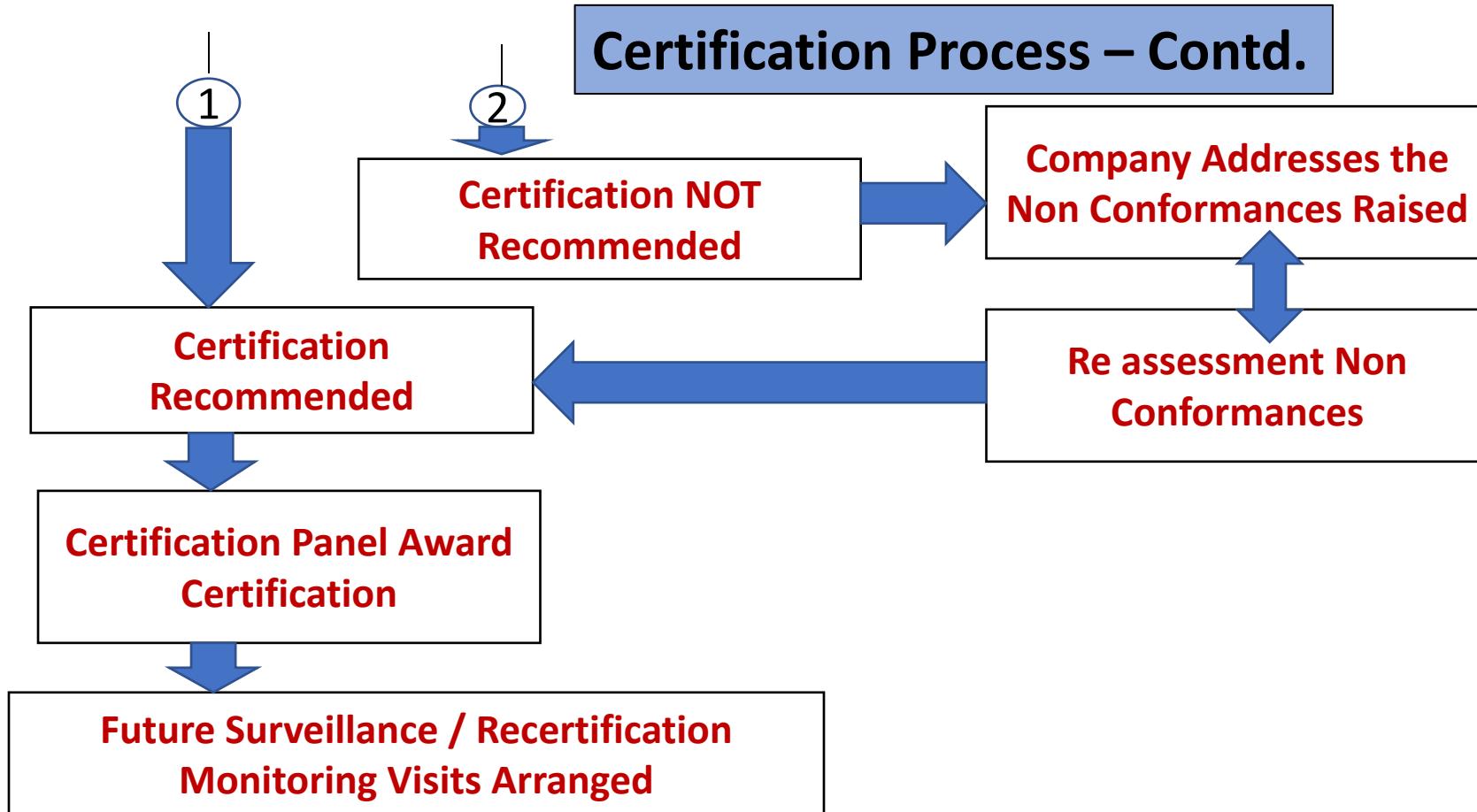
Three steps to complete



CERTIFICATION AND ACCREDITATION



CERTIFICATION AND ACCREDITATION



CERTIFICATION AND ACCREDITATION

Benefits of Third – Party Accredited Certification

- ❖ To win the new business opportunities
- ❖ Overseas Markets
- ❖ Identify best practice
- ❖ Reduction in bureaucracy
- ❖ Public trust
- ❖ Control costs
- ❖ Market differentiation
- ❖ Demonstrate due diligence
- ❖ Business efficiency



CONTEXT OF THE ORGANIZATION

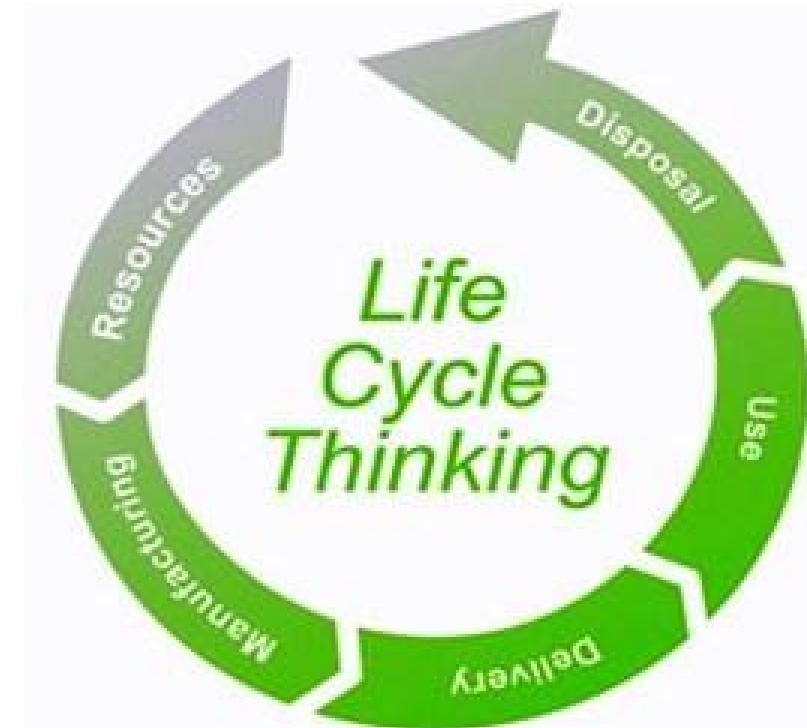
1. Understanding the organization and its context

An organization should conduct a context review that includes the following key areas:

- a. Identification of the relevant external and internal issues
- b. Consideration of how these issues can affect the organization's purpose
- c. Understanding of how the above points a and b can be addressed
- d. Identification of opportunities to improve its environmental performance.

CONTEXT OF THE ORGANIZATION

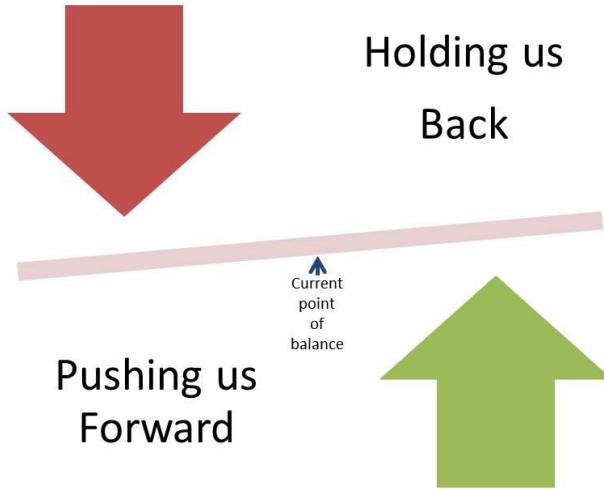
- Environmental sustainability in terms of procurement.
- Opportunities for competitive advantage including cost reduction and value for customers, and
- Life cycle thinking



CONTEXT OF THE ORGANIZATION

a. External Issues - Guidance

- Cultural
- Social
- Political
- Financial
- Technological
- Economic
- Natural
- Supply Chain Management
- Competition
- Market and public demand



CONTEXT OF THE ORGANIZATION

b. Environmental conditions including events – Guidance

- Meteorological, geological hydrological and ecological information.
- Historical disaster information
- General information documents
- Reports from previous audits
- Information from other management systems
- Applicable compliance obligations
- Codes of practice, national and international policies, guidelines and programmes
- Purchasing data

CONTEXT OF THE ORGANIZATION

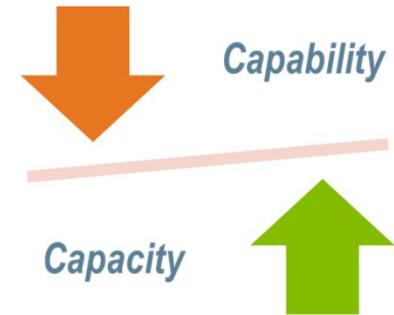
b. Environmental conditions including events – Guidance

- Product specifications, product development data, Safety Data Sheets (M/CSDS), or energy and material balance data
- Waste Inventories
- Monitoring data
- Environmental permit or licence applications
- Views of, requests from, or agreements with interested parties
- Reports on emergency situations and accidents

CONTEXT OF THE ORGANIZATION

c. Internal Issues - Guidance

- Organizational governance and structure
- Legal Compliance
- Policies, Objectives and the strategies
- Capability and capacity
- Information systems
- Internal relationships with, and perceptions and values of, internal interested parties
- Management systems and standards
- Organizational style and culture
- Contracts



CONTEXT OF THE ORGANIZATION

- 2. Understanding the needs and expectations of interested parties**
 - a. General**

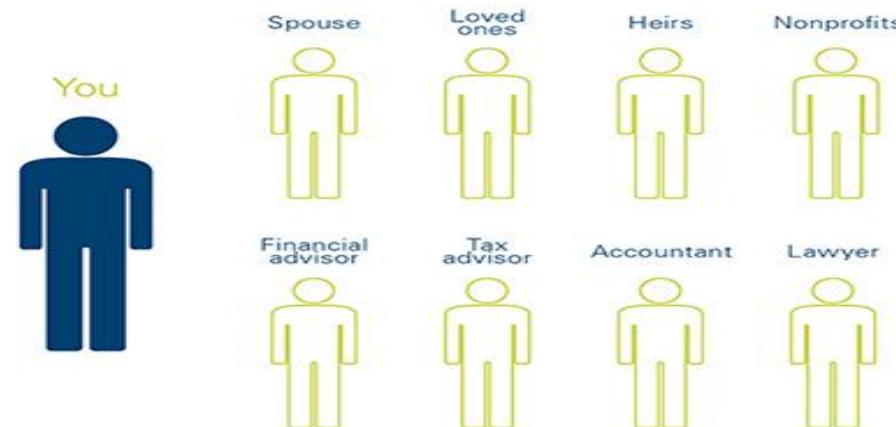
Interested parties are part of the context in which an organization operates. Developing a relationship with interested parties enables communication, which leads to understanding and the potential for building trust and mutual respect.

CONTEXT OF THE ORGANIZATION

2. Understanding the needs and expectations of interested parties

b. Determining interested parties

Interested parties can be both internal and external to the organization. An interested party can be a person, a regulating agency, a supplier or customer, a neighbourhood association, or other legally constituted organization.



CONTEXT OF THE ORGANIZATION

2. Understanding the needs and expectations of interested parties
 - c. Determining needs and expectations of interested parties

An organization should determine the needs and expectations of relevant interested parties. It is important to not only identify those that are obligatory and stated but also those that are generally implied (i.e. expected as a norm)

- d. Determining compliance obligations



ENVIRONMENTAL POLICY

1. EMS Policy



ENVIRONMENTAL POLICY

2. EMS Policy Requirements

- Its mission, vision, core values and beliefs,
- Guiding principles
- The needs and expectations of, and communication with, interested parties
- The internal and external issues that are relevant to the ems
- The actual and potential effects on the organization's activities from external environmental conditions
- Its commitment to comply with legal requirements and other requirements
- Its commitments related to protection of the environment, prevention of pollution and continual improvement.

ENVIRONMENTAL POLICY

- Protection of the environment and prevention of pollution - Guidance
- Protection of the environment
- Prevention of pollution
- Environmental policy and sustainability - Guidance

3. Related Documents

4. Auditor's Approach

RISK ASSESSMENT

1. Environmental Risk Assessment

Hazard: is the inherent potential for something to cause harm.

Risk: is a combination of the likelihood or probability that the hazard will cause actual harm and the severity of the consequences.



RISK ASSESSMENT

Environmental risk assessment can be thought of as containing the following key stages.

- 1. Hazard Identification**
- 2. Identification of the consequences if the hazard was to occur**
- 3. Estimation of the magnitude of the consequences.**
- 4. Estimation of the probability of the consequences.**
- 5. Evaluating the significance of a risk is the product of the likelihood of the hazard being realised and the severity of the consequences.**

RISK ASSESSMENT

Environmental Risk Assessment Matrix

Consequences of hazard being realized	High	Medium Risk	Medium Risk	High Risk	High Risk
	Medium	Low risk	Medium Risk	Medium Risk	High Risk
	Low	Low risk	Low risk	Medium Risk	Medium Risk
	Very low	Very low risk	Low risk	Low risk	Medium Risk
	1	Very low	Low risk	Medium	High
		Likelihood of hazard being realized →			

RISK ASSESSMENT

Uses of environmental risk assessment

2. Actions to Address Risk Associated with Threats and Opportunities

The planning process can help an organization identify and focus its resources on those areas that are most important for protecting the environment. It also enables fulfilment of compliance obligations, other environmental policy commitments, and for identifying and achieving its environmental objectives. Information generated in the planning process is an important input for determining operations that need to be controlled. Information can also be used in the establishment and improvement of other parts of the environmental management system, such as identifying training and competency, monitoring and measurement needs.

RISK ASSESSMENT

3. Significant environmental aspects

- a. Overview
- b. Understanding activities, products and services
- c. Identifying environmental aspects
- d. Understanding environmental impacts

Possible information sources for determining environmental aspects and environmental impacts - Guidance

- e. Determining significant environmental aspects

RISK ASSESSMENT

4. Risk associated with threats and opportunities



5. Planning to take action

ENVIRONMENTAL OBJECTIVES

1. Environmental Objectives



ENVIRONMENTAL OBJECTIVES

2. Planning actions to achieve

a. Setting Objectives

- Principles and commitments in its environmental policy
- Its significant environmental aspects
- Applicable compliance obligations to which the organization subscribes
- Threats and Opportunities
- Effects of achieving objectives
- Relevant needs and expectations of interested parties

ENVIRONMENTAL OBJECTIVES

2. Planning actions to achieve

a. Setting Objectives

- Technological options and feasibility
- Financial, operational and organizational considerations, including information from suppliers and contractors
- Possible effects on the public image of the organization
- Findings from environmental reviews
- Other organizational goals

ENVIRONMENTAL OBJECTIVES

b. Programme(s) for achieving objectives

The programme should address roles, responsibilities, processes, resources, timeframes, priorities and the actions necessary for achieving the environmental objectives.

ENVIRONMENTAL OBJECTIVES

c. Performance indicators

- Should establish measurable environmental performance indicators.
- Should be objective, verifiable and reproducible.

Performance Indicators - Guidance



COMPLIANCE OBLIGATIONS AND EVALUATION

Compliance obligations can result in threats and opportunities for the organization. An organization should establish, implement and maintain procedures to identify and have access to compliance obligations that are applicable to the environmental aspects of its activities, products and services.



COMPLIANCE OBLIGATIONS AND EVALUATION

2. Legal Requirements

Governmental, regulatory agencies, industry associations or trade groups, commercial databases and publications and professional advisors and services.



COMPLIANCE OBLIGATIONS AND EVALUATION

3. Other Compliance Obligations

The organization also needs to determine how other compliance obligations it has adopted, originating from other interested parties relate to the organization's environmental aspects.



COMPLIANCE OBLIGATIONS AND EVALUATION

4. Documented Information

- Register or List
- Help to maintain awareness & transparency



This register or list could include

- The source or origin of the compliance obligation
- An overview of the compliance obligation, and
- How the obligation relates to the organization's aspects and / or relevant requirements of interested parties.

COMPLIANCE OBLIGATIONS AND EVALUATION

Commitment to compliance - Guidance

OPERATIONAL PLANNING & CONTROL AND EMERGENCY PREPAREDNESS

1. Operational control

- The operations and associated processes are conducted in a controlled way.
- To fulfil the commitments of its environmental policy
- To achieve its environmental objectives, and manage its significant environmental aspects.
- And its risk associated with threats and opportunities.

OPERATIONAL PLANNING & CONTROL AND EMERGENCY PREPAREDNESS

Documented information can be developed as appropriate, for example.....

- **A specific sequence of activities that needs to be carried out**
- **Necessary qualifications of the personnel involved**
- **Key variables that need to be kept within certain limits**
- **Characteristics of the materials to be used**
- **Characteristics of the infrastructure to be used**
- **Characteristics of the products resulting from the process**

OPERATIONAL PLANNING & CONTROL AND EMERGENCY PREPAREDNESS

2. Identifying needs for operational controls

- Manage identified significant environmental aspects
- Ensure conformity with compliance obligations
- Achieve objectives and ensure consistency with its environmental policy
- Avoid or minimize risk associated with threats
- Optimize opportunities

OPERATIONAL PLANNING & CONTROL AND EMERGENCY PREPAREDNESS

3. Establishing operational controls

Operational controls are a specified way managing activities and can take various forms, such as procedures, work instructions, physical controls, use of competent personnel or any combination of these.

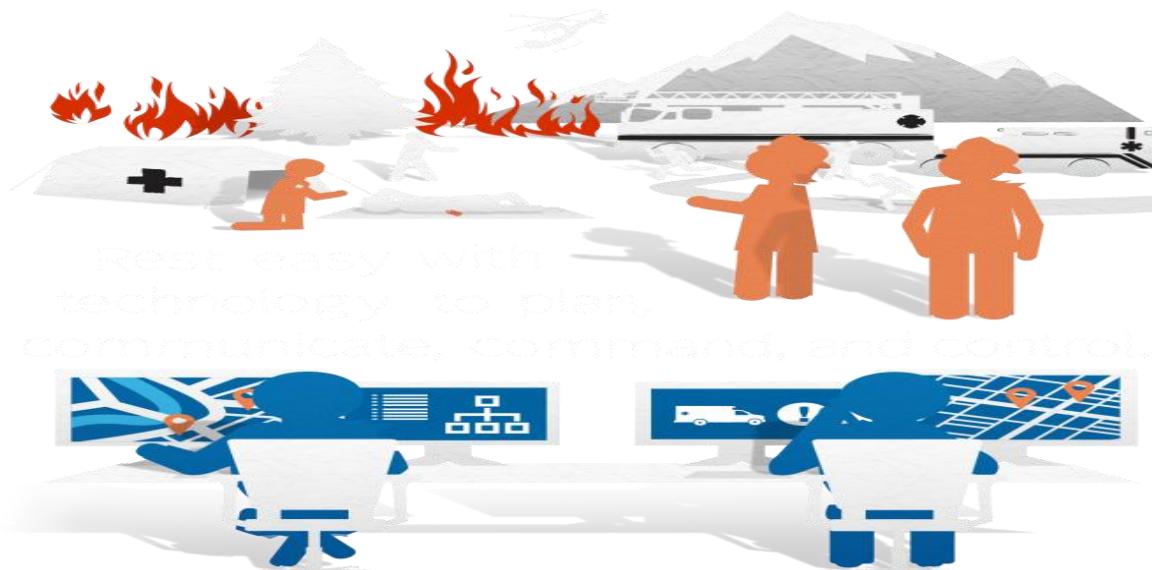
A common approach to establishing operational controls

- a) Choosing a method of control
- b) Selecting acceptable operating criteria
- c) Establishing processes, as needed, that define how identified operations are to be planned, carried out and controlled
- d) Documenting these processes, as needed, in the form of instructions, signs, forms, videos, photos, etc
- e) Applying technological options, such as automated systems, materials, equipment and software.

OPERATIONAL PLANNING & CONTROL AND EMERGENCY PREPAREDNESS

4. Emergency preparedness and response

In planning a response to an emergency situation consideration should be given to the initial environmental impact that can result, and any secondary impact that can occur as a result of responding to the initial environmental impact.



POLLUTION MANAGEMENT

Environmental Pollution

It can be defined as any undesirable change in physical, chemical or biological characteristics of any component of the environment. i.e air, water, soil.

Pollution

The term pollution can be defined as influence of any substance causing nuisance, then that particular substance may be called as the pollutant.



POLLUTION MANAGEMENT

Pollutant

Any substance causing Nuisance or harmful effects or uneasiness to the organisms, then that particular substance may be called as the pollutant.

Various Pollution Control methods we are going to deal are

- **Noise Management**
- **Air Pollution Management**
- **Water Pollution Management**
- **Solid Waste management**
- **Hazardous Material Management**

POLLUTION MANAGEMENT

Noise Management

Noise Pollution:

Noise is “ Unwanted Sound”. A sound might be unwanted because it is:

- Loud
- Unpleasant or annoying
- Intrusive or distracting



It refers to sounds in the environment that are caused by humans and that threaten the health or welfare of human or animal inhabitants.

POLLUTION MANAGEMENT

Noise pollution is not easy to measure, because the very definition of noise depends on the context of the sound and the subjective effect it has on the people hearing it. One person's idea of exultant, joyful music might be another person's pure torment.



POLLUTION MANAGEMENT

Sound Management

The decibel (abbreviated dB) is the unit used to measure the intensity of a sound.

Some common sounds and their decibel ratings:

- Near total silence – 0 dB
- A whisper – 15 dB
- Normal conversation – 60 dB
- A lawnmower – 90 dB
- A car horn – 110 dB
- A rock concert or a jet engine – 120 dB
- A gunshot or firecracker – 140 dB



POLLUTION MANAGEMENT

Any sound above 85 dB can cause hearing loss, and the loss is related both to the power of the sound as well as the length of exposure.

Eight hours of 90 dB sound can cause damage to your ears; any exposure to 140 dB sound causes immediate damage (and causes actual pain).

POLLUTION MANAGEMENT

Sources of Noise Pollution

Some Major Sources are

- Industrial Sources
- Transport Vehicles
- Household
- Public Address System
- Agricultural Machines
- Defence Equipment
- Miscellaneous Sources



POLLUTION MANAGEMENT

Industrial Sources:

Textile Mills, Printing Presses, Engineering establishments and metal works etc. contribute heavily towards noise pollution.



POLLUTION MANAGEMENT

Transport Vehicles:

Automobile revolution in urban centres have proved to be a big source of noise pollution. Increasing traffic has given rise to traffic jams in congested areas where the repeated hooting of horns by impatient drivers pierce the ears of all road users.



POLLUTION MANAGEMENT

Household:

The household is an industry in itself and is a source of many indoor noises such as the banging of doors, noise of playing children, crying of infants, moving of furniture, loud conversation of the inhabitants etc.



POLLUTION MANAGEMENT

Public Address System:

- Religious function
- Birth
- Death
- Marriage
- Elections
- Demonstration
- Commercial advertising etc.



Agricultural Machines:

- Tractors
- Thrashers

POLLUTION MANAGEMENT

- **Harvesters**
- **Tube wells**
- **Powered Tillers etc**

Defence Equipment:

- **Artillery**
- **Tanks**
- **Launching of rockets**
- **Explosions**
- **Exercising of Military airplanes**
- **Shooting Practices etc**



POLLUTION MANAGEMENT

Miscellaneous Sources:

- Automobile repair shops
- Construction-works
- Blasting
- Bulldozing
- Stone crushing etc

POLLUTION MANAGEMENT

Effects of Noise Pollution

- Hearing Problems
- Health Issues
- Sleeping Disorders
- Cardiovascular Issues
- Trouble Communicating
- Effect on Wildlife



POLLUTION MANAGEMENT

Methods to reduce Noise Pollution

- Control at Receiver's End
- Suppression of Noise at Source
- Acoustic Zoning
- Sound Insulation at Construction Stages
- Planting of Trees
- Legislative Measures

POLLUTION MANAGEMENT

Noise reduction Methods in Machines and Structures

- Vibration Control
- Vibration Isolation
- Machine Foot Isolation
- Vibration Damping
- Damping Thin Plates
- Avoiding Resonances
- Barriers
- Enclosures
- Acoustical Materials

POLLUTION MANAGEMENT

Some Noise Reducing Designs

- Centrifugal Fan Installation
- Axial Fan Installations
- Quiet Nozzles
- Filler Cooling Pipes
- Pneumatic Silencers
- Machining Castings

POLLUTION MANAGEMENT

Air Pollution Management

Air Pollution: It is the introduction of particulates, biological molecules, or other harmful materials into Earth's atmosphere, causing disease, death to humans, damage to other living organisms such as food crops, or the natural or built environment.

Sources of Air Pollution:

Air Pollutants is categorized in to

- Primary Air Pollutants
- Secondary Air Pollutants



Primary Air Pollutants: Materials that when released pose health risks in their unmodified forms or those emitted directly from identifiable sources.

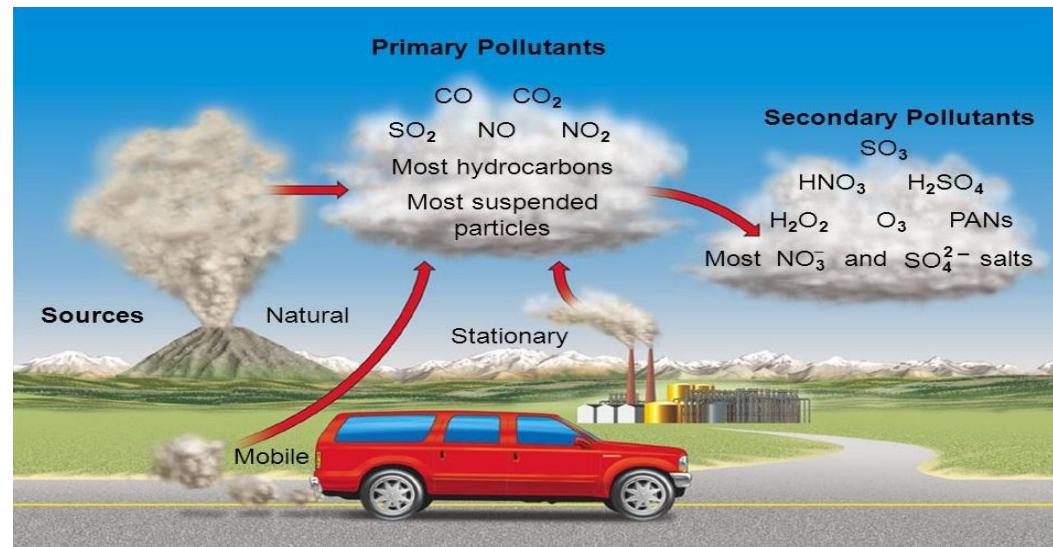
POLLUTION MANAGEMENT

Secondary Air Pollutants: Primary Pollutants interact with one another, sunlight, or natural gases to produce new, harmful compounds.

Primary Air Pollutants

Five major materials released directly into the atmosphere in unmodified forms.

- Carbon monoxide
- Sulfur dioxide
- Nitrogen Oxides
- Hydrocarbons
- Particulate matter



POLLUTION MANAGEMENT

Secondary Pollutants:

- Ozone
- PAN (Peroxy Acetyl Nitrate)
- Photochemical Smog
- Aerosols and mists (H_2SO_4)

Effects of Air Pollution

Human Health Effects

- Exposure to air pollution is associated with numerous effects on human health, including pulmonary, cardiac, vascular, and neurological impairments.

POLLUTION MANAGEMENT

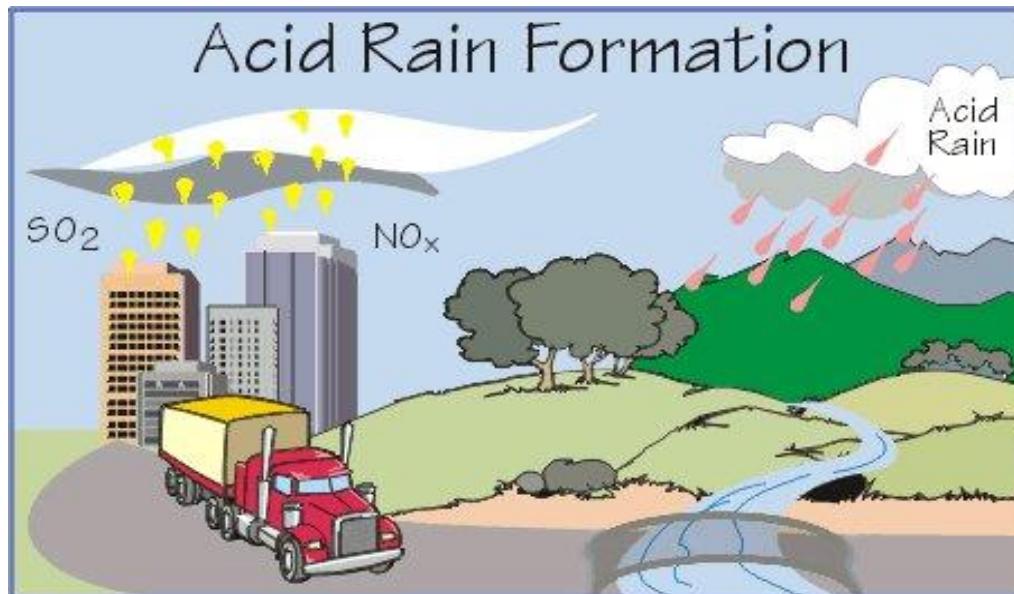
- Elderly, infants, pregnant women and sufferers from chronic heart and lung diseases.
- Children are at greater risk because they are generally more active outdoors and their lungs are still developing.
- Acute effects are usually immediate and often reversible when exposure to the pollutant ends. Some acute health effects include eye irritation, headaches and nausea.
- Chronic effects are usually not immediate and trend not to be reversible when exposure to the pollutant ends. Some chronic health effects include decreased lung capacity and lung cancer resulting from long-term exposure to toxic air pollutant

POLLUTION MANAGEMENT

Environmental Effects

Acid Rain:

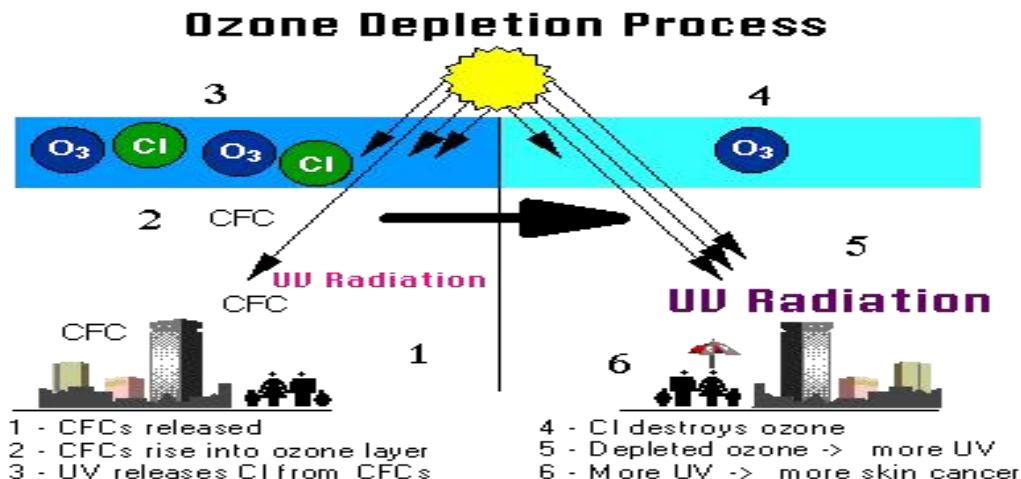
Acid rain is the result of the emissions of sulfate and nitrates into the atmosphere from the burning coal to produce electricity and deposited to the earth surfaces as an acid.



POLLUTION MANAGEMENT

Ozone Depletion

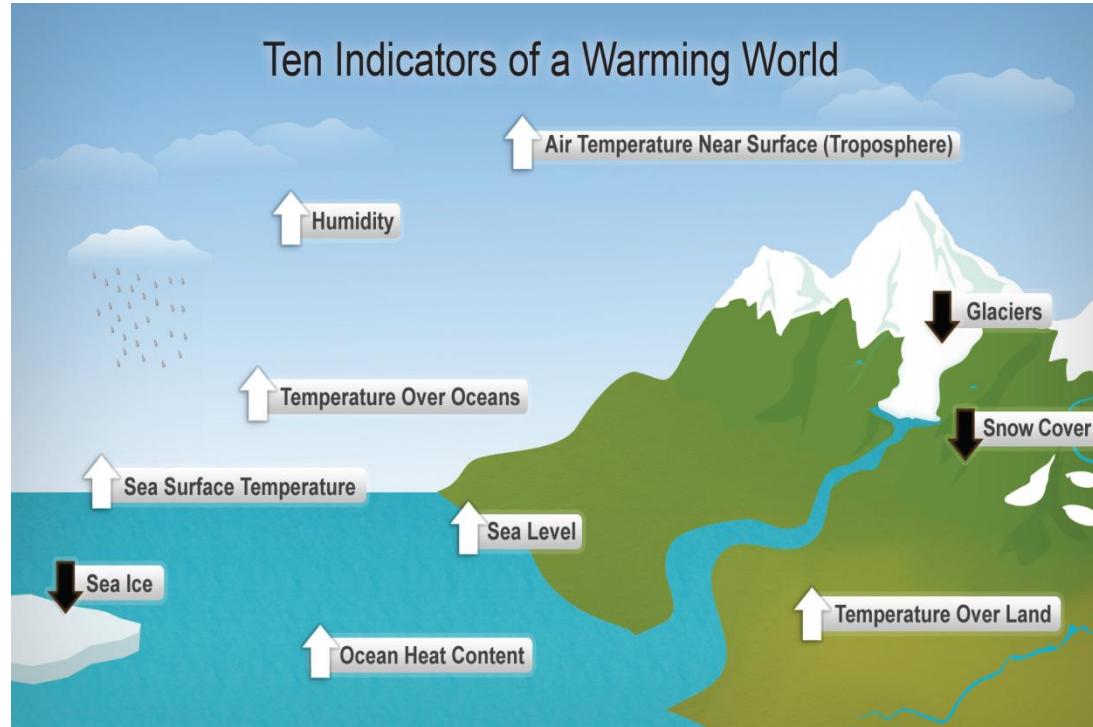
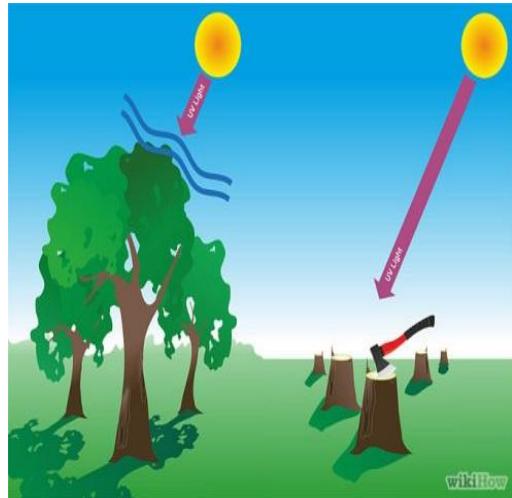
The Ozone layer is a thin layer in the atmosphere made up of oxygen atoms (O_3) that absorb harmful ultraviolet radiation (UV-B) from reaching the earth's surface. The ozone is being depleted by chemicals released into the atmosphere like chlorofluoromethanes (aerosol repellents and as refrigerants). One free chlorine atom will destroy 100,000 ozone molecules before it dies off.



POLLUTION MANAGEMENT

Global Warming:

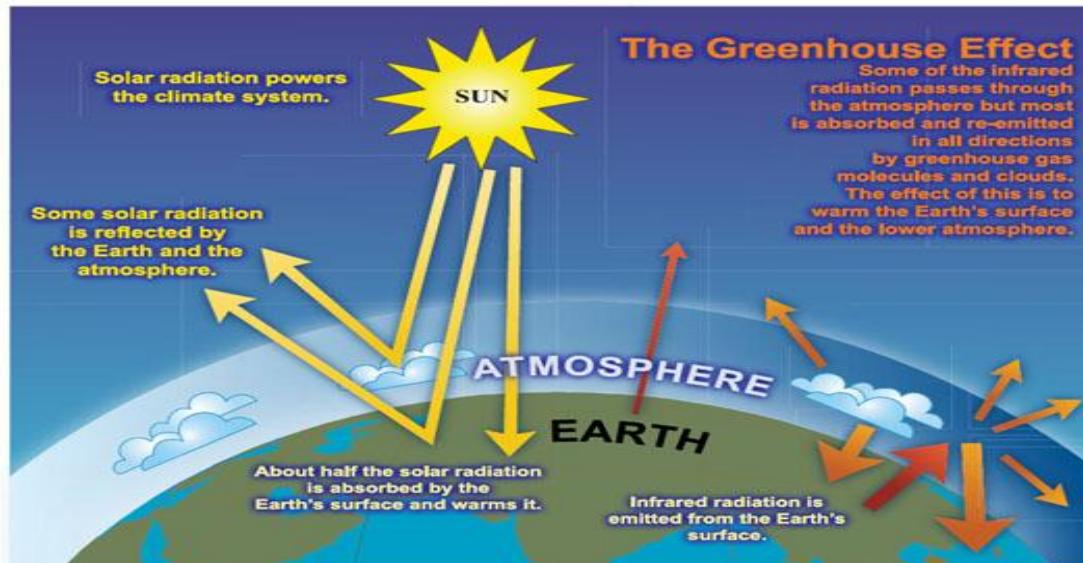
Global warming is the result of the troposphere trapping heat causing a greenhouse effect.



POLLUTION MANAGEMENT

Greenhouse Effect:

It is a phenomenon in which the atmosphere of a planet traps radiation emitted by its sun, caused by gases such as carbon dioxide, water vapour and methane that allow incoming sunlight to pass through but retain heat radiated back from the planet's surface.



POLLUTION MANAGEMENT

Methods to reduce Air Pollution

- Settling Chambers
- Cyclones
- Electrostatic Precipitators (ESPs)
- Change in Fuel
- Control of gaseous pollutants from stationary sources
- Absorption
- Adsorption
- Condensation
- Incineration

POLLUTION MANAGEMENT

Solid Waste Management

Solid waste management is a polite term for **garbage management**. Solid waste management is a system for handling all of this garbage, and includes municipal waste collection, recycling programs, dumps, and incinerators.

Sources of Solid waste:

- **Households**
- **Commercial Establishments**
- **Institutions**
- **Industries**
- **Open Space defecation**



POLLUTION MANAGEMENT

- Municipal Cleaning Service
- Agriculture
- Construction / Demolition

Types of Solid Waste

- Domestic Waste
- Commercial Waste
- Institutional Waste
- Industrial Waste
- Sanitation Residues
- Municipal Cleaning Waste

POLLUTION MANAGEMENT

- Agricultural Waste
- Construction Waste

Effects of Solid Waste Pollution

- Contaminates water and air, resulting into diseases and dysentery in Human beings
- Mosquitoes breed in the stagnant water, blocked due to waste chocked in the drains.
- Decomposition of solid waste spreads obnoxious odor in the air, thus polluting it.
- Burning of waste, especially plastic adds up obnoxious fumes in the air.

POLLUTION MANAGEMENT

- Garbage dumps and decomposed waste helps many harmful species to breed in them.
- The infected water supply also leads to large scale epidemics

Waste Hierarchy

- Eliminate (Do not produce the waste in the first place)
- Minimize / Reduce (Produce less of the waste)
- Reuse (Use again in the same form)
- Recycle (Process material and use again in a different form)
- Recovery (Incineration with energy recovery)
- Disposal (Landfill, preferably with methane capture)

POLLUTION MANAGEMENT

Methods to reduce Solid Waste Pollution

- Management support and employee participation
- Training
- Waste audits
- Good operating practices
- Material substitution practices
- Technological modification practices
- Recycling options
- Surplus chemical waste exchange options

POLLUTION MANAGEMENT

Water Pollution Management

Most of Water Pollution is man-made. It may also occur naturally by addition of soil particles through erosion, animal wastes and leaching of minerals from rocks.

POLLUTION MANAGEMENT

Sources of Water Pollution

- waste water discharged from industries and commercial bodies. These industries are chemical, metallurgical, food processing industries, textile and paper industries.
- Chemical fertilizers and pesticides
- Coolants and release hot water from power generating plants
- Washing clothes near lakes and rivers
- Oil Spills
- Flash floods and hurricanes



POLLUTION MANAGEMENT

Types of water pollution

Pollution by Point Sources:

Substances released from a single, identifiable source such as a pipe-most common example is the industrial pollution where a lot many harmful substances are released into water bodies.

Pollution by nonPoint Sources: Contamination of water bodies by substances that do not come from a discrete, specified source.

POLLUTION MANAGEMENT

Effects of Water Pollution:

- **Groundwater contamination from pesticides causes reproductive damages within wildlife in ecosystems.**
- **Sewage, fertilizer and agricultural run-off contain organic materials that when discharge into waters**
- **Depletion of oxygen**
- **Swimming in and drinking contaminated water causes skin rashes and health problems like cancer, reproductive problems, typhoid fever and stomach sickness in humans.**
- **Ecosystems are destroyed by the rising temperature in the water**

POLLUTION MANAGEMENT

Effects of Water Pollution:

- Water pollution causes flooding due to the accumulation of solid waste and soil erosion in streams and rivers.
- Oil spills in the water causes animal to die when they ingest it or encounter it.

Methods to reduce Water Pollution:

- Physical Method
- Chemical Method
- Biological Method
- Thermal Methods
- Fixation / immobilization / stabilization

POLLUTION MANAGEMENT

Hazardous Material Management

Material that, when improperly handled, can cause substantial harm to human health and safety or to the environment.

Source of Hazardous Materials:

- Radioactive substances
- Toxic chemicals
- Biological wastes
- Flammable wastes
- Explosives



POLLUTION MANAGEMENT

Effects of Hazardous Materials

How to handle Hazardous Materials

- Follow all the storage instructions on the product label
- Be sure to store all volatile products in well-ventilated areas.
- Make certain you store flammable products in the recommended temperature range.
- Keep all hazardous materials out of the reach of children and away from all animals
- Use the original container to store the hazardous material
- Reduce the amount of hazardous materials you keep in storage
- Do periodic maintenance storage areas.

PERFORMANCE EVALUATION

An organization should have a systematic approach, using competent personnel, for monitoring and measuring, analysing and evaluating its environmental performance on a regular basis. This should enable the organization to report and communicate accurately on its environmental performance.



PERFORMANCE EVALUATION

1. Monitoring and measurement

- Monitoring generally refers to processes where observations are made over time, without necessarily using instrumentation.
- Measuring generally refers to processes where instrumentation is typically used to determine qualitative or quantitative properties.



PERFORMANCE EVALUATION

2. Internal Audit

- Should be conducted at planned interval
- To determine and provide information to management
- To identify opportunities for improvement



PERFORMANCE EVALUATION

3. Management review

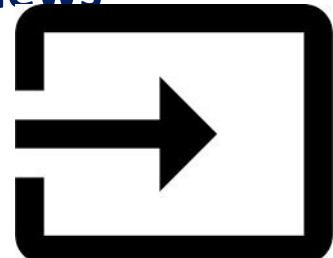
- Should be conducted at planned interval
- Conduct a review of its environmental management system
- To evaluate the system's continuing suitability, adequacy and effectiveness.



PERFORMANCE EVALUATION

Inputs to the management review

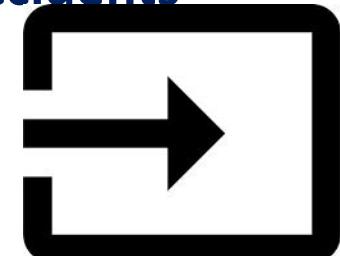
- Results of internal audits and evaluations of conformity including compliance obligations
- Communication from external interested parties, including complaints
- The environmental performance of the organization
- The extent to which objectives have been met
- Status of corrective actions
- Follow-up actions from previous management reviews
- Changing circumstances, including
- The organization's context



PERFORMANCE EVALUATION

Inputs to the management review

- Changes in the organization's products, activities and services
- Results of the evaluation of significant environmental aspects and risks associated with threats and opportunities from planned or new developments
- Changes in applicable compliance obligations
- The views of interested parties
- Advances in science and technology
- Lessons learned from emergency situations and accidents
- Recommendations for improvement



PERFORMANCE EVALUATION

Outputs from the review

- The system's suitability, adequacy and effectiveness
- Changes to physical, human and financial resources
- Actions related to possible changes to environmental policy, objectives and other elements of the environmental management system
- Actions
- Related to the organization's business strategy and other business processes

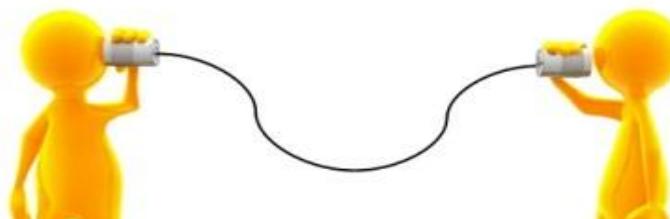


COMMUNICATION

Communication of environmental information should be based on, and consistent with, the information generated within the environmental management system and with the internal evaluation of the organization's environmental performance.

Communication of environmental information should be consistent with

- transparency, appropriateness and credibility, and
- Responsiveness and clarity



COMMUNICATION

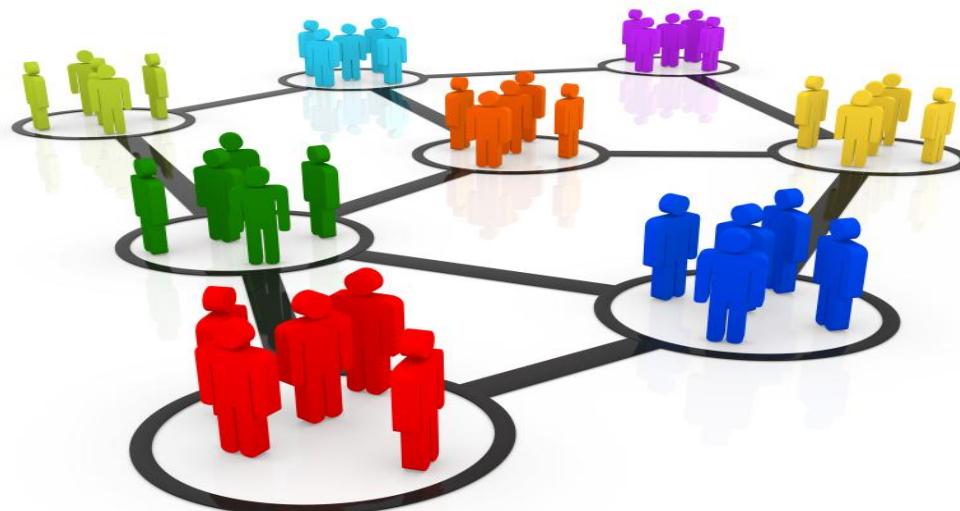
An organization should consider the following process steps:

- Gather information
- Determine the target audience(s) and information or dialogue needs
- Select information relevant to the audience's interests
- Decide on the information to be communicated to the target audience(s)
- Determine which methods and formats are appropriate for communication
- Evaluate and periodically determine the effectiveness of the communications process.

COMMUNICATION

1. Internal communication

- Communication between and among the levels and functions within an organization
- Crucial to the effectiveness of the environmental management system.



COMMUNICATION

2. External communication

- Communication with external interested parties
- Be an important and effective tool for environmental management.



DOCUMENTED INFORMATION

- Environmental management system is operating effectively.
- Is understood and by persons working under the control of the organization and other interest parties
- Processes associated with the environmental management system are carried out as planned



DOCUMENTED INFORMATION

Documented information – Guidance

Examples of documented information include

- a) Statements of policy and objectives
- b) Description of the scope of the ems
- c) Description of programmes and responsibilities
- d) Information on significant environmental aspects
- e) Procedures
- f) Process information
- g) Organizational charts
- h) Internal and external standards
- i) Site emergency plans
- j) Records (evidence of an outcome)

DOCUMENTED INFORMATION

1. Creating and updating

When creating and updating documented information the organization should ensure

- Identification and description
- Format
- Review and approval for suitability and adequacy.



DOCUMENTED INFORMATION

2. Control of documented information

- Information can be identified with the appropriate organization, division, function, activity or contact person
- Information maintained by the organization is regularly reviewed, revised as necessary and approved by authorized personnel prior to issue
- Current versions of relevant documented information are available at all locations
- Information that is obsolete is promptly removed from all points of issue and points of use.
- Developing an appropriate format that includes unique titles, numbers, dates, revisions, revision history and authority

DOCUMENTED INFORMATION

2. Control of documented information

- Assigning the review and approval of documented information
- Maintaining an effective distribution system



LEADERSHIP COMMITMENT, ROLES, RESPONSIBILITIES AND AUTHORITIES & RESOURCES, COMPETENCE, AWARENESS

- Top management sets the organization's mission, vision and values based on its context
- The needs and expectations of its interested parties
- Business objectives, and reflect these in its strategic plans



LEADERSHIP COMMITMENT, ROLES, RESPONSIBILITIES AND AUTHORITIES & RESOURCES, COMPETENCE, AWARENESS

1. Leadership Commitment

- Is not managed in isolation and separately from the central strategy of the business
- Is considered when strategic business decisions are made.
- Is aligned with business objectives
- Benefits from the appropriate level of resources
- Receives the appropriate involvement from across the business
- Provides real value to the organization, and
- Continually improves and remains successful in the long term

LEADERSHIP COMMITMENT, ROLES, RESPONSIBILITIES AND AUTHORITIES & RESOURCES, COMPETENCE, AWARENESS

2. Organizational roles, responsibilities and authorities

The top management should assign (a) representative(s) or function(s) with sufficient authority, awareness, competence and resources to

- a) Ensure the establishment, implementation and the maintenance of the environmental management system at all applicable levels of the organization
- b) Report back to top management on the environmental management system

Structure and responsibility - Guidance

LEADERSHIP COMMITMENT, ROLES, RESPONSIBILITIES AND AUTHORITIES & RESOURCES, COMPETENCE, AWARENESS

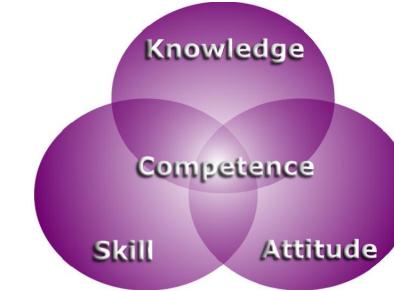


3. Resources

Human, physical and financial resources – Guidance

4. Competence

Examples of competence needs – Guidance



5. Awareness



1. Non conformity and corrective action

- Checking involves measurement, monitoring and evaluation of an organization's environmental performance.
- Corrective action consists of identifying and correcting problems



Corrective Action

Once a nonconformity is identified, it should be investigated to determine the cause, so that corrective action can be focused on the appropriate part of the system

2. Continual improvement

a. Opportunities for improvement

- Continual improvement is a key attribute of an effective environmental management system
- Continual improvement is accomplished through the achievement of environmental objectives
- The overall enhancement of the environmental management system or any of its components
- Should continually evaluate its environmental performance
- To identify opportunities for improvement

IMPROVEMENT

b. Implementation of continual improvement

- The actions for improvement should be planned, and changes to the environmental management system should be implemented accordingly
- Improvements need not take place in all areas simultaneously



MANAGEMENT OF AUDIT PROGRAMME

An audit programme should be established which can include audits addressing one or more management system standards or other requirements, conducted either separately or in combination (combined audit).

The extent of an audit programme should be based on the size and nature of the auditee, as well as on the nature, functionality, complexity, the type of risks and opportunities, and the level of maturity of the management system(s) to be audited.



MANAGEMENT OF AUDIT PROGRAMME

In order to understand the context of the auditee, the audit programme should take into account then auditee's

- organizational objectives
- relevant external and internal issues
- the needs and expectations of relevant interested parties
- information security and confidentiality requirements

MANAGEMENT OF AUDIT PROGRAMME

The audit programme should include information and identify resources to enable the audits to be conducted effectively and efficiently within the specified time frames. The information should include

- objectives for the audit programme
- risks and opportunities associated with the audit programme (see 5.3) and the actions to address them
- scope (extent, boundaries, locations) of each audit within the audit programme
- schedule (number/duration/frequency) of the audits
- audit types, such as internal or external

AUDITOR RESPONSIBILITIES

1. The Roles and Responsibility of the Team Leader

- Ensure the audit scope
- Select the audit team
- Direct the audit team members
- Planning the audit & make effective use of resources
- Represent the audit team
- Manage the audit team
- The preparation of the report



AUDITOR RESPONSIBILITIES

2. The Role of the Auditor

The auditor is responsible to the Lead Auditor for an allocated segment of the audit programme. This includes:

- Communicating audit requirements to the auditee
- Auditing in accordance with the relevant checklists
- Where time permits, examining discovered areas of concern
- Documenting observations
- Recording evidence
- Verifying the effectiveness of the Environmental system



AUDITOR RESPONSIBILITIES

3. The Role of the Auditee and Audit Client

Auditee: Organization being audited

Audit Client: Organization requesting the audit.

- a. Before the audit activity begins
- b. During the pre-audit visit or through other means of communication
- c. During the Audit
- d. Post – Audit



AUDITOR RESPONSIBILITIES

4. Roles & Responsibilities of Guides & Observers

Guides and observers may accompany the audit team with approvals from the audit team leader, audit client and/or auditee, if required. They should not influence or interfere with the conduct of the audit. If this cannot be assured, the audit team leader should have the right to deny observers from being present during certain audit activities.



AUDITOR RESPONSIBILITIES

5. Assigning responsibility for an individual audit to the audit team leader

The individual(s) managing the audit programme should assign the responsibility for conducting the individual audit to an audit team leader.

The assignment should be made in sufficient time before the scheduled date of the audit, in order to ensure the effective planning of the audit.

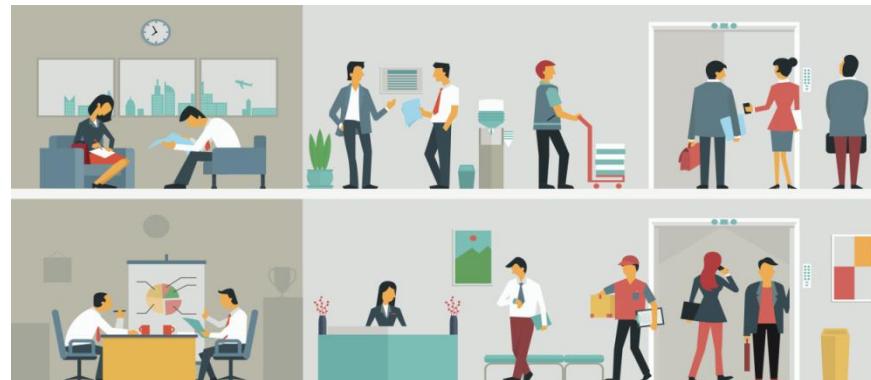
To ensure effective conduct of the individual following information should be provided to the leader



AUDITOR RESPONSIBILITIES

6. Code of Conduct – Confidentiality

All auditors are expected to comply with a code of conduct which emphasises the need for professionalism, confidentiality and behaviour which will harm neither the auditor's company nor the CQI / IRCA's public image. Any breach of this should be reported by the auditee to the CQI / IRCA. The UKAS also monitors auditor performance and this includes compliance with the code of conduct.



AUDITOR RESPONSIBILITIES

7. Audit Principles

Auditing is characterized by reliance on a number of principles. These principles should help to make the audit an effective and reliable tool in support of management policies and controls, by providing information on which an organization can act in order to improve its performance. Adherence to these principles is a prerequisite for providing audit conclusions that are relevant and sufficient, and for enabling auditors, working independently from one another, to reach similar conclusions in similar circumstances.

AUDITOR RESPONSIBILITIES

8. CQI / IRCA Code of Conduct

It is a condition of certification that you agree to act in accordance with, and be bound by the following CQI / IRCA Code of Conduct:

- 1. To act in a strictly trustworthy and unbiased manner in relation to both the organisation to which you are employed, contracted or otherwise formally engaged (the audit organization) and any other organisation involved in an audit performed by you or by personnel under your direct control.**
- 2. To disclose to your employer any relationships you may have with the organisation to be audited before undertaking any audit function in respect of that organization.**

COMPETENCE & EVALUATION OF AUDITORS

1. Competence & Evaluation Of Auditors

Confidence in the audit process and the ability to achieve its objectives depends on the competence of those individuals who are involved in performing audits, including auditors and audit team leaders. Competence should be evaluated regularly through a process that considers personal behaviour and the ability to apply the knowledge and skills gained through education, work experience, auditor training and audit experience.

COMPETENCE & EVALUATION OF AUDITORS

2 Determining auditor competence

- a. General
- b. Personal behaviour
- c. Knowledge and skills
 - (i) General
 - (ii) Generic knowledge and skills of management system auditors
 - (iii) Discipline and sector-specific competence of auditors
 - (iv) Generic competence of audit team leader
 - (v) Knowledge and skills for auditing multiple disciplines
- d. Achieving auditor competence
- e. Achieving audit team leader competence

COMPETENCE & EVALUATION OF AUDITORS

3 Establishing auditor evaluation criteria

The criteria should be qualitative (such as having demonstrated desired behaviour, knowledge or the performance of the skills, in training or in the workplace) and quantitative (such as the years of work experience and education, number of audits conducted, hours of audit training).

COMPETENCE & EVALUATION OF AUDITORS

4 . Selecting appropriate auditor evaluation method

The evaluation should be conducted using two or more of the methods given in Table 2. In using Table 2, the following should be noted:

- the methods outlined represent a range of options and may not apply in all situations
- the various methods outlined may differ in their reliability
- a combination of methods should be used to ensure an outcome that is objective, consistent, fair and reliable

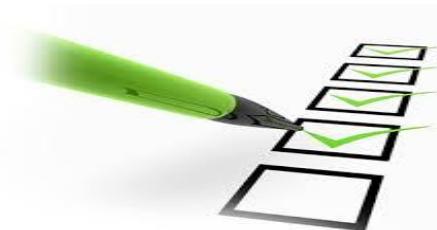
5 . Conducting auditor evaluation

The information collected about the auditor under evaluation should be compared against the criteria set in 7.2.3. When an auditor under evaluation who is expected to participate in the audit programme does not fulfil the criteria, then additional training, work or audit experience should be undertaken and a subsequent re-evaluation should be performed.

COMPETENCE & EVALUATION OF AUDITORS

6 Maintaining and improving auditor competence

Auditors and audit team leaders should continually improve their competence. Auditors should maintain their auditing competence through regular participation in management system audits and continual professional development. This may be achieved through means such as additional work experience, training, private study, coaching, attendance at meetings, seminars and conferences or other relevant activities.



PERFORMING AN AUDIT – PRE AUDIT ACTIVITIES

PLANNING THE AUDIT – PART 1

Typical audit activities may be divided into three phases

- 1. Pre-Audit Activities**
- 2. On-site Audit Activities**
- 3. Post Audit Activities**



PERFORMING AN AUDIT – PRE AUDIT ACTIVITIES

PLANNING THE AUDIT – PART 1

Pre-Audit Activities

1. Initiating audit
2. Establishing contact with auditee
3. Determining feasibility of audit



PERFORMING AN AUDIT – PRE AUDIT ACTIVITIES

PLANNING THE AUDIT – PART II

1. Preparing Audit Activities

- a. Performing review of documented information
 - Audit Sampling plans
- b. Audit planning
- c. Audit Planning Details
- d. Assigning Work to Audit Team
- e. Preparing Documented Information for Audit

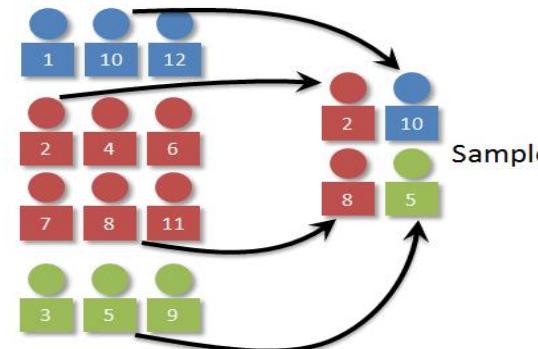


PERFORMING AN AUDIT – PRE AUDIT ACTIVITIES

PLANNING THE AUDIT – PART II

Sampling

- establishing the objectives of sampling
- selecting the extent and composition of the population to be sampled
- selecting a sampling method
- determining the sample size to be taken



PERFORMING AN AUDIT – PRE AUDIT ACTIVITIES

PLANNING THE AUDIT – PART II

- Judgement-based sampling
- Statistical sampling

Preparing audit work documents

When preparing audit work documents, the audit team should consider the questions below for each document.

Which audit record will be created by using this work document?

Which audit activity is linked to this particular work document?

Who will be the user of this work document?

PERFORMING AN AUDIT – PRE AUDIT ACTIVITIES

PLANNING THE AUDIT – PART II

Checklists

- a. Introduction
- b. Purpose
- c. Preparation of Checklists
- d. Advantages of Checklists
- e. Disadvantages of Checklist
- f. Essential features of a Process Based Checklist
- g. Conclusion



ON-SITE AUDIT ACTIVITIES – CONDUCTING THE AUDIT PART-1

1. Opening Meeting

Agenda

- Introduction
- Roles of auditor auditee guide observer
- Attendance list
- Audit objective
- Audit scope
- Audit Criteria
- Documentation status
- Agenda plan
- Audit methods
- Risk management
- Communications



ON-SITE AUDIT ACTIVITIES – CONDUCTING THE AUDIT PART-1

Agenda – Contd...

- Language
- Confirmation to resources and facilities
- Confidentiality
- Safety, security, and emergency considerations
- Reporting method
- Closing meeting
- Acknowledgments
- Complaints or appeals
- Concerns or questions

Participants



ON-SITE AUDIT ACTIVITIES – CONDUCTING THE AUDIT PART-1

2. Stage – 1 Audit



ON-SITE AUDIT ACTIVITIES – CONDUCTING THE AUDIT PART-1

3. Document Review



ON-SITE AUDIT ACTIVITIES – CONDUCTING THE AUDIT PART-II

1. Stage – 2 Audit



ON-SITE AUDIT ACTIVITIES – CONDUCTING THE AUDIT PART-II

2. Communication during the audit
3. Audit information availability and access
4. Reviewing documented information while conducting audit
5. Collecting and verifying information
6. Selecting sources of information
7. Visiting the auditee's location
8. Guidance on conducting Interviews



ON-SITE AUDIT ACTIVITIES – CONDUCTING THE AUDIT PART-II

9. Conducting Interviews

a. The Communication Process



ON-SITE AUDIT ACTIVITIES – CONDUCTING THE AUDIT PART-II

b. Talking

Technique	Benefits
Open: How... Why.... When.... Where... What.. How do you carry out your risk assessments?	➤ Encourages open discussion ➤ Relaxes auditee ➤ Encourages auditee to describe
Closed: Do... Can... Do you always send a copy of the completed risk assessments to the corporate Health and Safety Team?	➤ Allows definitive answers to be obtained ➤ Clarifies ambiguity ➤ Avoids auditee evading questions
Reflective: You said that.... You said that completed risk assessments from contractors do not always get sent to you. How do.. You handle those situations?	➤ Confirms information given previously ➤ Allows the auditee to expand ➤ Shows the auditee that the auditor is listening

ON-SITE AUDIT ACTIVITIES – CONDUCTING THE AUDIT PART-II

b. Talking – Contd..

Technique	Benefits
Comparative: Comparing.... How do risk assessments produced by teams on site compare with generic risk assessments?	➤ Allows auditor to focus on specific issues ➤ Encourages the auditee to open up discussion
Hypothetical: Imagine... What if ... What if the risk assessments had been reviewed by the manager and approved, but where not adequate for the job, what steps do you take?	➤ Allows auditor to ask specific questions about situations which may not have occurred ➤ Encourages auditee to think in a wider context



ON-SITE AUDIT ACTIVITIES – CONDUCTING THE AUDIT PART-II

b. Talking – Contd..

Technique	Benefits
<p>Leading:</p> <p>When... You do this then...</p> <p>When you receive the risk assessments from the contractors, you review them for adequacy, email the result to the purchasing manager and write a letter to the contractors, what happens then?</p>	<ul style="list-style-type: none">➤ Confirms understanding➤ Prevents the auditee giving information already given



ON-SITE AUDIT ACTIVITIES – CONDUCTING THE AUDIT PART-II

C. Listening

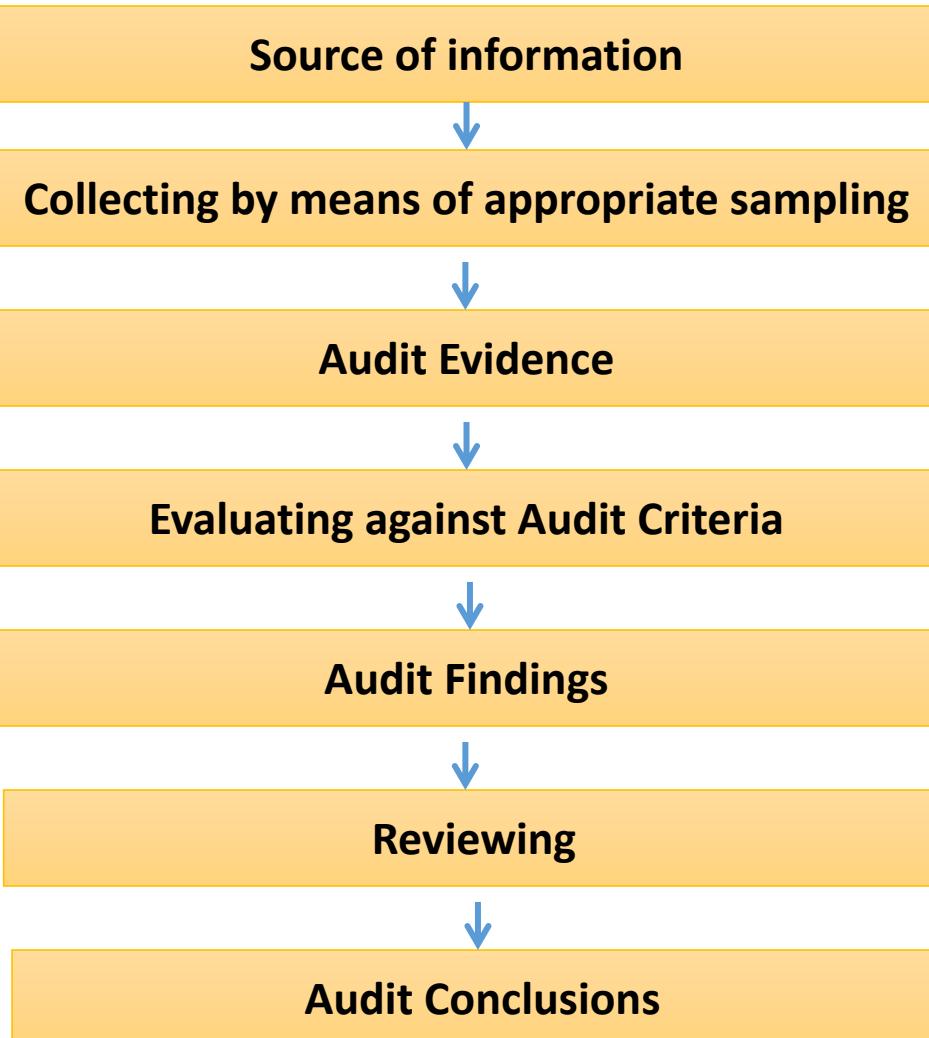


ON-SITE AUDIT ACTIVITIES – CONDUCTING THE AUDIT PART-II

d. Looking



ON-SITE AUDIT ACTIVITIES – CONDUCTING THE AUDIT PART-II



AUDIT FINDINGS

- 1. Determining Audit Findings**
- 2. Recording conformities**
- 3. Recording nonconformities**
- 4. Dealing with findings related to multiple criteria**



AUDIT FINDINGS

Conformity is the fulfillment of the requirements



AUDIT FINDINGS

Non Conformity is the non - fulfillment of a requirement.
In other words, a specified requirement is not being met.
This may be categorized as Major, Minor-Non Conformity



AUDIT FINDINGS

a. Minor Nonconformity

Minor Nonconformity would be the failure to conform to a requirement that in the auditor's judgment and experience is not likely to result in a failure of the Quality management system..

AUDIT FINDINGS

b. Major Nonconformity

Major Nonconformity would be the total breakdown of the Environmental management system or one of its processes, or the failure to address a key ISO 14001:2015 requirement.

It would be a nonconformity that in the auditor's judgment and experience would likely result in the system failure or materially reduce its ability to assure controlled processes.

AUDIT FINDINGS

c. Areas of Concern – Opportunities for Improvement

In some cases, a process may be found conforming, but still an area of concern. These observations may be written as Opportunities for Improvement. Since they are potential problem areas, the organization can consider taking preventive actions for these observations. Corrective actions are taken for the reported nonconformities.



AUDIT CONCLUSIONS AND CLOSING MEETING

Audit Conclusions



AUDIT CONCLUSIONS AND CLOSING MEETING

1. Closing Meeting

- review the audit findings and any other appropriate information collected during the audit, against the audit objectives
- agree on the audit conclusions, taking into account the uncertainty inherent in the audit process
- prepare recommendations, if specified by the audit plan
- discuss audit follow-up, as applicable



AUDIT CONCLUSIONS AND CLOSING MEETING

2 Content of audit conclusions

Audit conclusions should address issues such as the following:

- **the extent of conformity with the audit criteria and robustness of the management system, including the effectiveness of the management system in meeting the intended outcomes, the identification of risks and effectiveness of actions taken by the auditee to address risks**
- **the effective implementation, maintenance and improvement of the management system**

AUDIT CONCLUSIONS AND CLOSING MEETING

3 Conducting closing meeting

A closing meeting should be held to present the audit findings and conclusions.

The closing meeting should be chaired by the audit team leader and attended by the management of the auditee and include, as applicable

- those responsible for the functions or processes which have been audited
- the audit client
- other members of the audit team

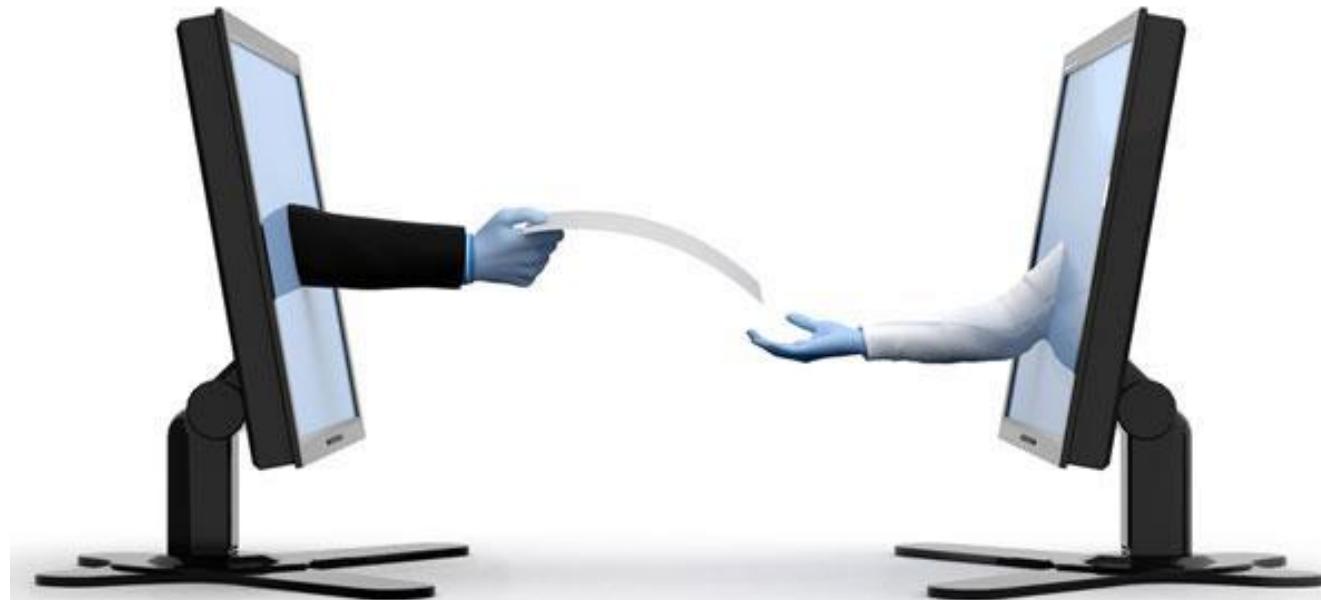
POST AUDIT ACTIVITIES – REPORTING AND FOLLOW UP THE AUDIT

1. Preparing the Audit Report



POST AUDIT ACTIVITIES – REPORTING AND FOLLOW UP THE AUDIT

2. Distributing the Audit Report



POST AUDIT ACTIVITIES – REPORTING AND FOLLOW UP THE AUDIT

3. Completing the Audit



POST AUDIT ACTIVITIES – REPORTING AND FOLLOW UP THE AUDIT

4. Conducting Audit Follow-up

