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MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT



Environmental Audit Guidance Manual

DEPARTMENT OF ENVIRONMENT MALAYSIA

Environmental Audit Guidance Manual

Note : Auditors or users of this Audit Manual are responsible to include the updates of any new regulations of new requirements to be used in the auditing processes.

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Environmental Auditing

1.1 Introduction

In an increasingly crowded world, societal expectations for a clean, healthy environment are forced into focus by the shrinking resources that they face. The 1992 UNEP conference in Rio de Janeiro was the landmark event that brought public attention to the global nature of our environmental problems and the magnitude of the damage. In this matter, it has long been recognized that the industrial sector and land development activities are a key contributor to the escalating environmental degradation of this planet through the intensive utilization of natural resources and the generation of environmental pollutants that overwhelm the natural environment's capacity to recover. It is inevitable therefore, that industry and developers now participate in the efforts to minimize the environmental impact to this planet and to do so in a sustainable manner for the sake of the future generation.

In many of the OECD countries such as the USA, Canada, and the EU states, environmental audits are a common voluntary practice as a tool to help industry become environmentally responsible and to demonstrate this responsibility to the government and/or public. They measure an organization's environmental performance and encourage continual improvement in minimizing adverse impact to the environment.

In Malaysia, environmental auditing has largely been practiced by ISO14001 certified companies and multinational industrial facilities that are regularly audited by their corporate environmental auditors. These companies represent only a small fraction, less than 10%, of the number of manufacturing companies in Malaysia. An estimate in 2004 places the registered SMEs in Malaysia at about 40,655 companies which represent about 90% of the total manufacturing companies in the country. The number of manufacturing companies continually rises with recent figures showing that between the years 2000 to 2004, the Malaysian Industrial Development Authority (MIDA) approved 4591 new manufacturing projects of which 3353 have become operational. These numbers

represent a significant challenge in the monitoring of compliance to the environmental regulations.

The value of the environmental audit as a continuous improvement tool which can provide productivity and cost gains at the same time as protecting the environment has yet to be appreciated on a larger scale. There is instead, a perception that the environmental audit may have a negative impact on the organization by exposing the companies to penalties and imposition of costly changes to the facility. This perception has to change.

acceptance by industry of its responsibility for the environment and... assess compliance to the environmental regulations.

As the country continues to develop and mature economically, consumer environmental interest and environmental requirements from other interested parties such as insurance companies, banks, and shareholders will grow in tandem with the development of the society. There has to be a significant shift in the perspective of the manufacturing sector and the developers to prepare for this as the environmental quality of our planet becomes an increasing and permanent focus in our every day lives.

Therefore to ensure compliance and self-regulation, the Government has introduced the requirement to carry out Environmental Audits in Section 33A, Environmental Quality Act (EQA) 1974 (Amendment 1996). The Environmental Audit is defined in the EQA 1974 as:

“environmental audit” means a periodic, systematic, documented and objective evaluation to determine –

- (a) the compliance status to environmental regulatory requirements*
- (b) the environmental management system; and*
- (c) the overall environmental risk of the premises*

The longer term goal is to achieve the sustainable development objectives of the country.

A set of new audit regulations will be gazetted to elaborate on the requirements for meeting Section 33A, Environmental Quality Act, 1974. The primary objective is to assess the compliance status of industrial facilities and development projects that are subject to the Environmental Quality Act 1974 and to provide a systematic approach to ensuring compliance. The longer term goal is for industry and developers to eventually self-regulate its environmental management and help achieve the sustainable development objectives of the country.

1.2 Purpose of the Guidance Manual

This guidance manual sets out the expectations of the DOE in meeting the requirements of Section 33A, Environmental Quality Act, 1974.

The manual facilitates the understanding on the legal requirements and help the industry and developer prepare to be audited.

The contents of the manual also provide audit practitioners with:

- a. Guidelines for conducting compliance-type environmental audits
- b. Basic information for the conduct of environmental risk assessments that are provided for in the regulation.
- c. Requirements on the follow-up of the environmental audit or risk assessment.
- d. Roles and responsibilities of the various parties in the different stages of the audit process

The environmental audit manual will cover the basic audit methodology – when to conduct an audit, auditor selection, roles and responsibilities of the environmental auditor, the audit tasks, the audit protocol and the environmental audit report. The functional use of the audit report by the organization shall be discussed in relation to DOE's expectations for regulatory compliance. The term 'organization' here is used interchangeably with 'auditee' to denote the "occupier or owner directed or notified to carry out an environmental audit".

The term 'organization' here is used interchangeably with 'auditee' to denote the "occupier or owner required to carry out an environmental audit" as requested under Section 33A, Environmental Quality Act, 1974.

The environmental audit methodology described in this manual is designed to meet the requirements of DOE for the regulatory compliance-type audit. It is expected that the compliance-type audit will also assess the environmental management system that is in place in the organization. The audit methodology will be provided together with sample checklists that can be used during the pre-audit and on-site audit phases. The standard of auditing as prescribed in this manual has taken into consideration the guidelines in the ISO19011: Auditing Standards.

This manual will also briefly describe some examples of the types of risk assessments that may be required by DOE.

1.3 Requirements to conduct Environmental Audit

The approach in this guidance manual is to encourage the widespread adoption of environmental auditing as a common risk management tool and to enable the DOE to focus on managing organizations that are consistently not complying to the regulations and showing little attempts to rectify the non-compliance.

The primary type of environmental audit that will be required by DOE is a **regulatory compliance-type audit**. A **regulatory compliance-type audit** investigates the organization's intent to manage its environmental issues for compliance to the regulations. The main objective of the compliance-type environmental audit is to identify conditions that are out of compliance and for bringing the condition back into compliance as soon as practicable.

The audit seeks to set the organization on a path to sustainable practices in which resources are utilized efficiently and waste and pollution are correspondingly reduced. This shall be evident in the remedial action proposed as a result of non-compliance discoveries made during the audit. The environmental audit must be carried out by a competent auditor which is explained further in Chapter 2: The Environmental Auditor. *(Note : DOE is in the process of introducing the registration scheme. However, before the implementation of mandatory registration, organizations are still required to appoint only environmental auditors who are competent and have vast experience in conducting environmental audit with good knowledge in environmental legislations and requirements).*

Requirement for environmental audit will be done through notification from DOE to the organization. It should be noted however, that those organizations which are already required to conduct environmental audits as a Condition of Approval for the Environmental Impact Assessment or as Condition of License must continue to conduct the environmental audits without waiting for notification from the DOE.

1.4 General Description of Regulatory Compliance Audit

The compliance audit provides a systematic accumulation of evidence about an organization's compliance status to the regulatory requirements relevant to that organization and provides an indication of the environmental risk that it poses.

The compliance audit can serve as performance improvement tool. The compliance audit can also be viewed as a performance improvement tool where the organization gains a better understanding of how it compares to specified criteria in order to raise the standard of its environmental management. Management and staff of an organization become more aware of and take more responsibility for complying with environmental regulations.

The audit can also spur innovation as organizations seek cost effective pollution prevention methods to reduce the significant environmental impacts discovered during the audit process, for example in areas of energy conservation and material reduction, reuse and recycling.

The compliance audit generally has the following objectives:

- As a tool to assess compliance with environmental legislation;
- To improve environmental performance through monitoring the effectiveness of the management system;
- To increase the company's knowledge of itself and its activities thus increasing its ability to continually improve and minimize future potential liabilities;

The audit process is commonly structured into three phases:

- **Pre-audit** [Chapter 2 and 3]
 - Select auditor, review preliminary information and prepare audit plan and checklist
- **On-site audit** [Chapter 4]
 - Opening meeting, conduct the audit at site, closing meeting
- **Post-audit** [Chapter 5 and 6]
 - Prepare audit report and implement corrective and preventive action

The entire process to conform to the legal requirement is shown in Appendix 1: The Audit Process Flowchart. This process, when applied systematically, will generally lead to a successful audit with clear and objective findings that can be acted on. The remedial process to correct non-compliances will be described further in Chapter 6.

The expected time frame of completion of a compliance-type environmental audit beginning with the initiation of the audit up until submission of the audit report to DOE should be about one to two months. The actual time taken to accomplish this is subject to the cooperation of all parties in the audit and the size and complexity of the facility being audited. If the audits are repeated in subsequent years, the period of completion of the entire audit process could possibly be reduced.

1.5 General Description of Environmental Risk Assessment

Apart from the compliance-type environmental audit, DOE may also require the conduct of environmental risk assessments. These are to address specific environmental risks that have been identified either by way of communication from interested parties, or detected by DOE through its enforcement activities or as a result of the environmental compliance-type audit.

For example, if residents from a nearby housing estate lodge a complaint that the chimney emission from a factory is causing respiratory difficulties and dermal sensitivities, then the DOE may require the factory to conduct an environmental risk assessment to assess the types of pollutants emitted by the chimney, the dispersion pattern, the rate of emission and the potential effect on the environment.

Some examples are provided here to indicate the wide variety of risk assessments that may be requested by DOE:

- Site assessment of decommissioned plants
- soil and groundwater monitoring to determine extent of pollution from a suspected chemical spill
- monitoring and modelling the dispersion of ammonia fumes from a chemical plant
- mass balance studies to determine actual quantities of scheduled waste generated

In risk assessment, the potential environmental risks normally warrant deeper investigation that could require extensive sampling, modelling or monitoring of

air, water, soil and/or groundwater quality. These risk assessments can include highly specialized assessment techniques which will not be explored in detail in this manual but is briefly described in Chapter 7. Further guidance on this can be found in various publications available as listed in the reference section.

1.6 ISO14001 Audits

As of January 2006, there were 566 organizations in Malaysia certified to the ISO14001 Environmental Management System. These organizations practice periodic self-audits and are also independently audited by the certification body on an annual basis. A certified environmental management system is an assurance that the organization has a process in place to manage its compliance issues.

Such organizations will not be automatically exempted from the requirements of the proposed new EA regulation although DOE will take into consideration that the organizations have voluntarily certified to the ISO 14001 standard. There is also no exemption from penalties for non-compliances discovered during the audit. However, the audit conducted is not a fault finding mission, therefore usually the organization will be given chance to rectify their problem through the implementation of Corrective Action Plan. Final decision will be on case by case basis, and also depends on the seriousness of the problem.

1.7 Other independent or Third Party Audits

A number of multi-national manufacturing organizations in Malaysia are subjected to Environmental Health and Safety (EHS) audits conducted by their parent corporate auditors usually on a two to three year cycle. These organizations are not exempt from the requirement to conduct an environmental audit or to conduct an environmental risk assessment. If these organizations receive such notification, they may use the corporate ESH audit reports as additional information or supporting documents (audit material) for the audit.

There are also many SMEs which are being audited by their main customers to determine whether their ESH performance is in line with the customer's environmental, occupational health and safety policies. These supplier audits only gather preliminary information on the status of the supplier's environmental management practices and do not carry sufficient detail to determine the nature and extent of regulatory compliances in the SMEs' facility. These supplier audit reports could be part of the documentation to be reviewed during an actual compliance audit conducted at site.

The Environmental Auditor

2.1 Selecting the Auditor

The environmental audit shall be carried out by competent and independent third party auditors

The environmental audit and risk assessment shall be carried out by competent and independent third party auditors. The auditor who is selected shall take the lead in conducting the audit and this function is

further described in this chapter. *(Note : DOE is in the process of introducing the registration scheme for auditors. However, before the implementation of mandatory registration, organizations are still required to appoint only competent environmental auditors who have vast experience in conducting environmental audit particularly regulatory compliance types of audit with good knowledge in environmental legislations and requirements).*

The selection of a registered auditor by the organization requires some appreciation of what an audit entails. Organizations should appreciate that the environmental audit and risk assessment required under Environmental Quality Act, 1974 are much more than an inspection and documentation of the site conditions. The audit shall investigate the environmental problems that are noted at the site to determine the root cause of the regulatory non-compliance so that the organization can take feasible steps to improve the conditions. The benefits of this to the organization have already been discussed in Chapter 1.

Select auditors that have a depth of experience that can match the needs of the site and provide the right direction

Organizations which have complex environmental issues at their location should therefore select auditors that have a depth of experience that can match the needs of the site and who can provide the right direction that the organization needs to take to comply with the

environmental legal requirements. **In the process of selecting an auditor, the organization is therefore advised to request for the auditor’s resume describing their relevant auditing and industry sector experience.**

An organization’s internal auditors are disallowed from conducting the compliance type audit for their own organization as an element of conflict presents itself. In some instances, the internal auditor may also be the person disclosing information or be closely linked with the person disclosing information. This is not consistent with the objective of an audit being an independent assessment and therefore the norms of auditing shall prevail i.e. the auditors shall be independent of the organization being audited to ensure that the audit is able to withstand public and regulatory scrutiny.

After the establishment of Environmental Auditor Registration Scheme, the organization will normally have the responsibility to select the auditor from the list of registered auditors maintained by the DOE. However, under certain circumstances, DOE may also select and/or appoint the auditor.

2.2 Auditor Qualification

Auditors who applied to be registered with DOE will be assessed for basic competency according to several criteria summarized as follows:

- Education - Related B.Sc and B. Eng
- Minimum Environmental Auditing experience
- Industrial Sector experience
- Certified skills in environmental auditing and relevant environmental management and technology
- Understanding of the environmental regulations of Malaysia
- Personal attributes

Interested applicants are required to sit for a compulsory training provided by DOE and pass the necessary assessment. In addition, some Registered Auditors may be assessed as competent to conduct the environmental risk assessment, however they will have to fulfill additional requirements.

Auditor registration can be done on-line Those persons wishing to be registered as auditors with DOE should read the “Guidelines for Registration of Environmental Auditors in Malaysia” published by DOE. Auditor registration will be made available on-line on the DOE website. Applicants should be aware that working and auditing experience is a significant factor in the registration criteria.

Registered Auditors are expected to demonstrate objectivity and independence while maintaining professional integrity in the conduct and reporting of the audit. The Registered Auditor commits to conforming to the Auditor Code of Conduct as spelt out in the registration guidelines.

2.3 Roles & Responsibilities of the Auditors

The audit shall be conducted by at least two persons, one whom must be a Registered Auditor (after introduction of registration scheme) who functions as the Lead Auditor. The audit team should be independent of the organization that they audit to ensure the objectivity of the audit, its findings and conclusions. They should be free from bias and any potential conflict of interest throughout the audit process. As a basic guideline, the auditors should not be presently engaged with or have worked for or been contracted by the organization two years prior to the environmental audit. The Lead Auditor should not be from the same company that conducts the environmental monitoring at the organization's facility or site.

a. Lead auditor

The Lead Auditor who leads the audit has the most responsibility in any audit such as

- Planning the audit for e.g. identify the audit assistants and their roles and responsibilities, identify scope, prepare checklists, audit dates and timetable;
- Notifying the audit visit dates to DOE and to the client;
- Ensuring the efficient and effective conduct and completion of the audit within the audit scope and plan;
- Preparing and submitting the audit report to DOE.

The Lead Auditor will sign the report

The Lead Auditor shall also take an active role in the site audit activities and shall not delegate the task of the site audit activities entirely to the audit assistants. The Lead Auditor will sign the report indicating prime responsibility for the findings and recommendations in the audit report. The Lead Auditor may be called upon as material witness in court proceedings.

The Lead Auditor will maintain neutrality at all times as he/she does not assume the role of a regulatory enforcement officer and shall avoid behaviour that may be construed as such.

b. Audit Assistant

Audit assistants should have certified skills in environmental auditing

The remainder of the audit team must work as a unit and the range of auditing and technical skills must be balanced among the team members. The audit assistants should be competent enough to carry out the audit and have, as a minimum, certified skills in environmental auditing. The list of team members must be sent to DOE together with the notification for audit (from lead auditor to DOE). The audit shall be carried out unless DOE objects to the list of team members. Audit Assistants will be named in the audit report and therefore have co-responsibility for the findings in the report.

Detailed criteria for audit assistants can be found in the “Guidelines for Registration of Environmental Auditors in Malaysia”. Any person wishing to participate in any audit team will be required to sit for a compulsory training and assessment provided by DOE.

2.4 Audit Mandays and Fees

The cost of the audit shall be borne by the organization regardless of whether the auditor was selected by the organization or by DOE.

The registered Lead Auditor shall provide an estimate of the number of man-days and fee required to conduct the audit. A guide to the recommended number of man-days is provided in *Appendix 2: Guidance for Determination of Auditor Days*.

The Scale of Audit Fees will be prescribed in the “Guidelines for the Registration of Environmental Auditors in Malaysia”.

Preparing for the Compliance-Type Audit

3.1 DOE Notification of Audit to organization

As stated earlier, DOE may notify selected industries or developers to conduct the environmental audit, if necessary. For organizations, which are already required to conduct environmental audit as part of the Conditions of Approval for EIA Reports or Conditions of Licenses, the audit shall be conducted without waiting for notification from DOE.

In the notification letter, DOE will indicate the type of audit requested in the notification document i.e. whether it is a compliance audit and/or environmental management system audit and/or an environmental risk assessment.

In the notification letter, DOE will also provide the Audit Tracking Number which must be referenced when the audit report is submitted to the DOE.

3.2 Lead Auditor Notification of Audit to DOE

Notify DOE of the site visit date, attach audit plan

The Lead Auditor who is appointed by the organization shall notify the DOE of the site visit date using Form A [see *Appendix 3: Form A – Notification of Audit by Registered Auditor*]. The Lead Auditor shall fill in the form with the required details including the Audit Tracking Number which shall be obtained from the DOE's notification letter to the organization. The audit plan shall also be attached when submitting the notification of audit to DOE. The preparation of the audit plan is discussed in the following section.

The Lead Auditor shall send the Notification of Audit to the relevant party (DOE Headquarters or State Office) that issued the request for audit.

3.3 Preparing for the Audit

When the registered auditor has been appointed by the organization, the Lead Auditor shall then proceed with preparations for conducting the site audit. This entails evaluating preliminary information about the organization in order to develop the audit scope and plan which will be agreed with the organization.

In order to facilitate this process, the organization shall nominate a representative who will have the authority to release to the auditor the types of information that will be requested for the audit preparation.

a. Audit Scope and Preliminary Review

Before an audit is carried out, the scope of the audit has to be determined by the Lead Auditor in accordance with the type of audit requested by DOE in their audit notification to the organization. Determining the scope includes defining the extent and boundaries of the audit such as physical location, processes and organizational activities.

A general guideline for the scoping exercise is that all processes and activities in the organization, which will contribute to the effective compliance to the Environmental Quality Act, 1974 and its subsidiary regulations shall be included.

The Lead Auditor shall request for preliminary information from the organization which allows the auditor to determine the scope of the audit. The information provided will influence the number of man-days required for the site audit and how the time will be utilized during the site audit.

The types of preliminary information that the auditor should request for (where applicable) are the

- organization's site layout showing key activities,
- description of key activities (process flow)
- an outline of environmental monitoring programs
- EIA conditions of approval
- Conditions of licences
- Written approvals
- Environmental Management Plans
- Erosion Control and Sedimentation Plans
- Any other approvals related to the Environmental Quality Act 1974
- Other relevant documents

Use pre-audit checklist to get information, minimize new discoveries at site

The auditor may also use the pre-audit checklist provided in *Appendix 4: Pre-Audit Checklist* to facilitate the process of obtaining the relevant documents from the organization. The organization must submit the preliminary information to the auditor within 14 calendar days of the date the request is received. The Lead Auditor shall notify DOE if the organization does not submit the preliminary information within this or other agreed timeframe. If the organization seeks exclusion of areas to be audited from the audit scope, the Lead Auditor shall document this in the environmental audit report.

It is advisable for the organisation to make all relevant information available to the Lead Auditor during the scoping exercise to minimize complications during the site audit. For example, if it is discovered that there are additional activities occurring at the site which are/could be under the jurisdiction of the Environment Quality Act, 1974 the auditor may enlarge the audit scope to include the new discovery.

If the organization is unwilling to include the discoveries in the scope of the audit, the auditor shall carry on with the agreed scope and at the same time the auditor shall notify DOE immediately. The new discovery and the reasons for the unwillingness of the organization to enlarge the audit scope shall be documented in the environmental audit report.

b. Audit Plan

Based on the information obtained in the preliminary review, a written audit plan shall be prepared and submitted by the Lead Auditor to the organization prior to the site audit. The audit plan shall also be attached to the Form A: Notification of Audit to DOE.

The audit plan serves as the blueprint for the conduct of the environmental audit. The plan will include audit objectives, the scope and criteria of the audit and the functional units to be audited. It requires that the site audit activities of each of the audit assistants be mapped out in a timetable. This timetable facilitates the Lead Auditor's responsibility for tracking and managing the audit to achieve the audit objective.

The audit plan shall cover:

- Audit date(s) and timetable of audit activities
- Audit objective and scope
- Members of the audit team
- Audit criteria

c. Site Audit Checklist

An auditor should use a customized audit protocol that is relevant to the particular industry and location that is being audited. These checklists function as memory aids during the audit to ensure that all relevant regulatory issues are duly audited and would be prepared prior to the site visit. Several samples of these protocols (checklists) are provided in Appendix 5 as guidance namely

- Clean Air Regulation 1978
- Scheduled Waste Regulation 2005, and
- Construction Site Audit
- Sewage & Industrial Effluent Regulations 1979

(now replaced by Environmental Quality (Sewage Regulations) 2009 ;Environmental Quality (Industrial Effluent Regulations) 2009 and Environmental Quality (Control of Pollution from Solid Waste Transfer Station and Landfill) Regulations 2009

Note : Auditors or users of this Audit Manual are responsible to revise the checklist to include the updates of any new regulations of new requirements to be used in the auditing processes.

Customize the site audit checklist to suit the industry or site. The regulatory checklists in Appendix 5 should be tailored to the particular industry that is being audited as these regulations cover many different types of industrial emissions and are not relevant to all types of industry. Therefore, it is very important that the auditor should either add or delete the specific regulatory requirement from the checklist relevant to the site. For example, a plastic component manufacturing facility that does not emit sulphuric acid gases should not include the emission limits specified for sulphuric acid in the Environmental Quality (Clean Air) Regulation 1978 in their audit protocol.

Similarly, the construction site audit checklist should also be customized to the type of construction site encountered. The construction sites could be as varied as a hillslope development, coastal reclamation works or infrastructure works that cut through residential areas. Therefore, it is only sensible that the checklist items shall include those issues that will be pertinent to the site

Expand checklist to include other regulations as necessary Besides the three regulations provided in the sample checklist, there are other regulations in the Environmental Quality Act 1974 which the auditor should reference in preparing the checklist for a particular facility or site.

Apart from the general regulatory checklist, other items shall be extracted from other relevant documents and attached as separate checklists. Examples of other relevant documents are:

EIA conditions of approval

- Conditions of licences
- Written approvals
- Environmental Management Plans
- Any other approvals related to the Environmental Quality Act 1974

Finally, the auditor should also formulate the checklist for an appropriate level of detail to which he/she is comfortable with. A more experienced and knowledgeable auditor may only need the basic regulatory checklist without having to document detailed questions to assess the compliance. Less experienced auditors may need to use a detailed checklist that lists everything that they need to know and do.

d. Safety and Health Requirements

The Lead Auditor shall clarify with the organization on the safety and health requirements of the facility prior to the site visit to ensure that the auditors are equipped with the appropriate Personal Protective Equipment as necessary.

Auditors entering construction sites should be aware that they must attend a safety orientation and certification called the Green Card issued by the Construction Industry Development Board.

Conducting the Site Audit

4.1 Opening Meeting

The opening meeting conducted by the Lead Auditor is necessary for the purpose of communicating with the organization in an official manner the purpose of the audit. An opening meeting is usually brief in nature and the agenda normally includes

- introduction of the audit team members to the organization,
- presenting the scope of the audit,
- presenting the objectives of the audit and the audit plan,
- providing the organization with a short summary of the methods and procedures to be used in the audit, and
- assurance of the confidentiality of the audit process and audit report

It is also an opportunity for both parties to come to an agreement on the audit timetable and to confirm the time and date of the closing meeting. The senior officials of the organization are required to be present at the opening meeting and may be interviewed in the process of auditing the site. The Lead Auditor shall retain a copy of the attendance list at the opening meeting for inclusion in the environmental audit report.

Safety and health requirements for the site should also be clarified in the opening meeting to ensure the safety of the environmental auditor during the site audit.

4.2 Conducting the Audit

The actual conduct of the audit includes collecting audit evidence, which is done through interviews with key personnel, examination of documents and observation of activities and conditions. The auditor would use his audit checklists to help navigate through the issues in a systematic manner.

Document all evidence in the Audit notes. Keep for 3 years

All interviews, documents examined and observations of the environmental conditions at the site shall be documented in the Audit Notes. Audit Notes comprise all the notations made in the checklists and on additional sheets of paper that are properly organized and cross-referenced with the checklist items. Audit Notes are extremely important to demonstrate that a comprehensive audit has been conducted. These audit notes shall be retained by the auditor and held confidential except when required by DOE. The Lead Auditor shall ensure that the audit notes are protected from damage and loss and kept for three years.

a. Interviews

Interviews are an integral part of an audit. The purpose is to gauge the level of understanding and awareness of the relevant regulatory compliance issues. It is an opportunity for the auditor to verify his observations and information obtained from documents reviewed. New information obtained during interviews should also be verified with independent sources (other persons, observations, or records), otherwise it is hearsay which is generally inadmissible.

Before the interviews are conducted, a general interview plan may be prepared to keep the interview focused. This plan identifies those to be interviewed in one-to-one meetings at all levels from management to operations and can be in parallel with the audit protocols prepared.

The interviewing strategy should be aimed at extracting the most relevant and pertinent information from each level of employee and management. Useful information can be established by posing questions surrounding possible non-compliance scenarios. The questions should be geared towards accumulating information in order to arrive at a conclusion of whether the organization has proactively managed its regulatory compliance and provided sufficient resources, training and procedures for this purpose.

b. Examination of Documents

Another important activity to be carried out during an audit is the examination of documents related to the organization's environmental management system (EMS) that may have influenced on the compliance level. The auditor should also ask for evidence of letters written to or applications submitted to DOE for areas of non-compliances. There is a need to inspect relevant

- monitoring records for environmental emissions / discharges / disposals (it is recommended to review a minimum of the past 12 months of records and to verify the locations of the monitoring points against approved plans)

- monitoring procedures and maintenance procedures for specific environmental control equipment such as pH meters for treated water discharge, continuous emission monitoring systems, etc.
- calibration and testing records of environmental control equipment
- scheduled waste consignment notes and inventory,
- regulatory permits and licences,
- DOE Conditions of Approvals
- Approved drawings and layouts
- Written approvals and
- Environmental Management Plan
- Erosion Control and Sedimentation Plan (ESCP)

Note : List of documents to be reviewed depends on the type of activities

In some cases, information may have to be obtained from indirect records for e.g. chemical purchase quantity, water consumption and electricity bills to reconcile with other information provided by the company. For example, the water consumption records can be compared with volume flows from the waste water treatment plant while the chemical purchase quantity can be compared with reported quantities of scheduled waste disposed.

Establish the reliability of monitoring data The internal procedures in the organization, where available, could be cross-checked with regulatory requirements for existing standards, legislation, permits, etc to determine the consistency of its environmental management. Also, all records of compliance should be investigated and the adequacy of monitoring programs should be examined. A key aspect that the auditor should establish is the reliability of the monitoring data presented.

The internal audit reports or other third party audit reports, if any, may also be reviewed to determine the progress that the organization has made in managing its environmental issues.

c. Observation of Activities and Conditions

Observation of activities and conditions is perhaps the most important element in an environmental compliance audit. The auditor must be alert to abnormal operational conditions and concealment of evidence. These should be followed-up with site personnel until enough information is obtained to conclude on the potential non-compliance.

Observations should also be carried out beyond the main areas of the facility such as in stores, workshops and laboratories. Further attention should also be given to the general surroundings of the site, e.g. drainage systems and discharge points, evidence of land contamination, odours and visible emissions.

Photographs of site conditions may be taken with prior notification to the auditee of this requirement. For industrial processes, the auditee may disallow photography of processes or equipment which is patented to the auditee's organization and the reasons for this decision shall be documented in the audit report. Evidence to show that the process is patented must be attached in the audit report. Photographs may not be used for any purpose other than inclusion in the site's audit report.

d. Collecting Environmental Samples

Collection of environmental samples during the compliance audit may be necessitated if the lead auditor or DOE has reasonable doubt that the environmental controls in place are not effective or that the monitoring data is unreliable. However, this shall be decided in consultation with DOE prior to the start of the audit.

For example, if DOE or the auditor is concerned that the waste water treatment plant is undersized or the treatment system is not appropriate, then the auditor may collect treated effluent samples for laboratory testing to determine compliance with the Environmental Quality (Sewage and Industrial Effluent) Regulations 1979. Other instances which may necessitate some sampling are when there is a high indication of previous and/or existing soil and groundwater contamination at the site. The soil sampling exercise should not require heavy machinery and should be easily accomplished with minimal tools. In the case of emissions from chimneys, the auditor should identify prior to the site visit whether air sampling is required as it requires more resources and advanced preparation.

The number of samples taken shall conform to guidelines that will be issued by the DOE. However, the sampling program conducted during an environmental regulatory compliance audit should be limited and is not intended to be an in-depth study of the extent of the non-compliance at site. It should be noted that the sampling done at the compliance audit stage is to obtain indication of whether a more extended sampling program is required at the site.

All sampling procedures will follow the protocol laid out by the DOE for such purpose to ensure sample integrity up to the point of receipt at the testing laboratory. The laboratories used shall be SAMM accredited for those parameters to be tested. All sampling and testing costs shall be borne by the organization.

In the event of objections to the site sampling by the organization, the auditor is advised to hold off the sampling until DOE resolves the matter and to carry on with the rest of the compliance audit as normal. If environmental sampling is

unable to be accomplished during the audit for whatever reason, it may form part of the recommendations in the audit report if the auditor determines that it is necessary.

e. Collate Audit Findings

At the end of the site audit, the auditors will need to summarize the key audit findings i.e. non-compliance issues which should be brought to the attention of the organization. In writing up the non-compliance, the auditors shall take into consideration any substantial evidence which shows that the organization is actively in process of complying and shall reflect this in the audit report.

The Lead Auditor has the responsibility to ensure that the findings derived by the auditors are based on factual evidence and can withstand scrutiny. The body of evidence built up for each finding shall be easily verified and traceable. Please refer to ‘Chapter 5: Audit Report’ for further guidance on writing Audit Findings.

The audit team shall discuss their findings and agree on them before presenting it to the site management. The discussion must be accomplished within the timeframe allocated for the site audit before the conduct of the closing meeting.

4.3 Closing Meeting

At the end of the site visit, a closing meeting is held to ensure that the organization has clearly understood and acknowledged the audit findings.

Present the non-compliances	The Lead Auditor shall present the non-compliance findings and discuss them with the organization and provide an opportunity for the organization to make further clarifications or provide additional information that may have been missed during the audit. However, the organization’s acceptance of the audit findings is not required for final reporting by the Lead Auditor.
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Document auditee’s comments or objections; Auditee to sign on the summary	The Lead Auditor shall prepare a summary sheet of the audit non-compliances and the organization’s representative shall sign the sheet acknowledging the findings (see the sample Audit Findings Summary Sheet shown in Appendix 6]. Where applicable, the summary sheet shall also document the auditee’s comments on or objections to the audit findings, if any. The Lead auditor shall also document if any environmental sampling was done by indicating
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- time and date of sampling,
- what types of samples were taken,

- the number of samples taken and
- the location of sampling

This signed summary sheet shall be retained by the Lead Auditor for insertion into the audit report that will be sent to the DOE. A copy of the summary sheet shall be given to the organization.

Explain the requirement to submit action plan The Lead Auditor shall explain the obligation of the organization to develop the corrective action plan for the non-compliances which must be submitted by the organization to the DOE within 21 calendar days of the site audit. See ‘Chapter 6: Corrective/Preventive Action’ for further details.

The closing meeting normally takes one to two hours and the auditor should ensure that it is conducted in a neutral manner and avoid disputes with the organization’s representatives. The Lead Auditor shall retain a copy of the attendance list at the closing meeting for inclusion in the environmental audit report.

A copy of the summary sheet and attendance list shall be sent to DOE within one day after the audit completed either by e mail or fax.

4.4 Audit Disruptions

If during or before the site audit, an unexpected event occurs that shuts down part of or the whole facility or which will disrupt the audit process, it is reasonable for the auditor to curtail the audit and reschedule it to another day. The organization shall notify the auditor in writing and copy to the DOE.

The Audit Report

5.1 Preparing the Audit Report

The audit report shall be prepared for submission to the DOE according to the guidelines provided. A sample of the report format and possible contents of the report are shown in Appendix 6. Basically, the report should contain the following items:

- A. AUDIT ADMINISTRATIVE DETAILS
- B. REGULATORY COMPLIANCE SUMMARY
- C. MAIN REPORT – (AUDIT FINDINGS and RECOMMENDATIONS)
- D. ATTACHMENTS

5.2 Writing Audit Findings

The findings will fall into the following categories:

Compliance

There is sufficient and appropriate evidence to demonstrate the particular regulatory requirement has been complied with.

Non-compliance

Clear evidence has been collected to demonstrate the particular regulatory requirement has not been complied with.

Note:

If the organization has begun the process of compliance for e.g. they have submitted applications to DOE and are awaiting the approval or they have issued a work order to a contractor to begin a new monitoring program, the DOE still considers that the organization is not in compliance as the approvals have not been obtained or the monitoring results are not available. However, the Lead Auditor will ensure that the mitigating circumstances are noted when documenting the non-compliance.

When writing non-compliances for air pollution control equipment as allowed for in the Environmental Quality (Clean Air) Regulation 1978 and for water pollution equipment as allowed for in the Environmental Quality (Sewage and Industrial Effluent) Regulation 1979, the non-compliances shall be cited separately for each equipment. In the case of the Environmental Quality (Scheduled Waste) Regulation 2005, all instances of scheduled waste found not in compliance with the regulation can be grouped when citing the specific regulation.

Observations

Issues of environmental concern were observed which did not strictly relate to the scope of the audit or assessment of compliance. Further observations are considered to be indicators of potential noncompliance or areas where environmental performance may be improved.

or

Conditions of Approval (COA) were difficult to interpret or are no longer applicable (the Lead Auditor to explain the circumstances in the audit report).

An example of the types of non-compliances that can be written are shown below. See Appendix 6 for further examples.

No.	Regulation Title or COA Reference Number	Regulation or COA number	Description of Non-compliance
1.	EQ (Clean Air) Regulation 1978	Reg 36	The auxiliary boiler has no written approval and there is no evidence that the application has been made
2.	EQ (Clean Air)	Reg 36	The start-up generator has no written

No.	Regulation Title or COA Reference Number	Regulation or COA number	Description of Non-compliance
	Regulation 1978		approval however, an application has been submitted to DOE on the 15 th of December, 2006.
3.	EQ (Clean Air) Regulation 1978	Reg 42	The CEMS system for chimney no. 2 has not been operational since 3 rd January, 2007. The organization is in the process of selecting the contractor to undertake the rectification works.
4.	EQ (Scheduled Waste) Regulation 2005	Reg 3	The generation of waste methanol and discarded lithium batteries since 2005 has not yet been notified to the DOE.
5.	EQ (Scheduled Waste) Regulation 2005	Reg 8 (1)	The discarded lithium batteries have not been disposed as a scheduled waste to a prescribed premise but have been disposed as normal rubbish since 2007.
6.	EQ (Scheduled Waste) Regulation 2005	Reg 9(3)	Two drums of waste methanol at the store had open bungholes and are left uncapped until it is time to transfer the waste methanol out of the plant. No secondary containment is provided.

Environmental sampling results

If environmental sampling has been conducted during the audit, the evaluation of the test results against the limits specified in the Environmental Quality Act or in the Conditions of Approval shall be discussed and documented in the audit report. If the test results do not comply with the limits, then additional non-compliances must be written and reflected in the Regulatory Compliance Summary. The additional non-compliances shall be informed by the Lead Auditor to the organization for their further action.

5.3 Regulatory Compliance Summary

The Regulatory Compliance Summary (RCS) has been developed to facilitate the administrative processing of the audit reports that will be submitted to the DOE. Furthermore, the RCS will also be useful for quick review on the audit findings by the higher management of the organization. Based on the non-compliances issued, the Lead Auditor shall fill up the Regulatory Compliance Summary (RCS) (Appendix 7). In the sample audit findings in Section 5.1 above, two regulations in the Environmental Quality (Clean Air) Regulation 1978, were not complied with in 3 instances, and the corresponding entry in the RCS will be as follows:

Regulation Title or Condition of Approval Reference Number	Regulation number or COA item number	Number of non-compliances
EQ (Clean Air) R 1978	Reg 36	2
	Reg 42	1
EQ (Scheduled Waste) R 2005	Reg 3	1
	Reg 8	1
	Reg 9	1

5.4 Developing Audit Recommendations

The audit is intended to be a useful exercise for the organization and a key part of that is for the auditor to develop audit recommendations that are environmentally beneficial and practical. An appropriate recommendation addresses the root cause of the problem including administrative or management deficiencies. It also provides a yardstick to DOE to gauge the appropriateness of the action taken by the organization.

The Lead Auditor prepares audit recommendations

The Lead Auditor should provide enough information in the audit recommendation for the organization to develop a preliminary idea of the expected level of corrective and preventive action but not be so specific as to be construed as binding requirements. The Lead Auditor shall advise the organization that the corrective action plan is to be submitted to DOE within 15 calendar days of the site visit.

For recommendations that involve technology and operational issues, the auditor could introduce cleaner production concepts and the concept of BAT (best available technology) which will lead the organization towards sustainability in the long-term. The audit recommendations provided by the Lead Auditor *do not necessary require delving into process engineering details or stipulating* that a particular environmental technology must be employed. Auditors with relevant experience and education of course may give specific advice and recommendations to their auditee, however, final decision shall be decided by the auditee. For decision that involves high cost such as upgrading or opting for new technology, usually, it is best that the organization conduct further investigation or research on their own or using highly experienced consultants in the relevant area.

For administrative or management issues, the recommendations shall not be too prescriptive to be construed as interference in the management of the audit site. However, the recommendations shall reflect whether the administrative and management system in the organization has been effective in addressing the environmental non-compliances. The recommendations could cover the need for

- adequate staffing,
- clearly defined roles and responsibilities,
- appropriate training,
- clear procedures,
- improving the monitoring of its environmental emissions/discharges,
- greater management oversight,
- periodic internal audits, etc.

An example of an audit finding and the recommendation is provided below.

Audit Finding

Scheduled Waste Regulation 2005 - Regulation (9) A proper scheduled waste storage area has not been established for the waste methanol and discarded lithium batteries. The waste methanol is stored in steel drums on wooden pallets placed on top of the drain without secondary containment and without protection from the elements.

Audit Recommendation

Provide proper scheduled waste storage with protection from the elements, secondary containment, hazard signages and segregation of incompatible scheduled waste. The flammable wastes store should have explosion proof electrical fixtures. Conduct training for the personnel handling and storing the scheduled waste. Monitor the proper storage of scheduled waste and keep the Fifth Schedule Inventory updated.

The audit recommendations are not legally binding...

As discussed earlier, the audit recommendations made by the Lead Auditor are not legally binding and can be improved upon by the organization if their own analysis suggests that there may be an alternative approach which will yield equally acceptable results or better.

5.5 Distributing the Audit Report

The audit report must be signed by the appointed registered Lead Auditor and a printed copy issued directly to the DOE State Office. A printed copy and softcopy (Pdf format in CD-ROM) must also be submitted to the DOE Headquarters. Another copy shall be sent to the organisation. All submissions must be done within 14 calendar days after the audit or any other specified timeframe. In the event of any factual error found in the audit report, the organization shall notify DOE on the correction involved.

Prompt reporting secures the non-compliance as quickly as possible to minimize further environmental damage. Therefore, the reporting period has been established to reflect the importance of the audit exercise and shall prevail unless otherwise agreed upon or notified by DOE.

Compliance-type Environmental Audit

The audit report shall be issued to the organization and DOE within *14 calendar days* from the site visit date.

Environmental Risk Assessment

The audit report shall be issued to the organization and DOE within the *time frame that will be directed by DOE*.

DOE Managed Environmental Audit or Risk Assessment

The urgent nature of event requires the auditor to produce the audit or risk assessment report as quickly as possible within a *time frame that will be directed by DOE*.

5.6 Audit Confidentiality

The following restriction on distribution is to appear in all audit reports:

This report is for the use of the Department of Environment only and should not be distributed outside the Department of Environment without permission of the Director General of Environment.

Auditors to sign confidentiality form

The audit report and associated audit notations are privileged information documents and therefore confidentiality must be respected and appropriately safeguarded by the auditors and all reported recipients. The auditors and Lead Auditor shall sign a standard confidentiality form (see Appendix 8) and attach it to the audit report.

The audit report shall not be made available to the public either by the auditor or by the DOE, unless an injunction has been received by the DOE to release the report to the injured party. The injured party is a party who by legal avenues, is seeking compensation for injuries that are purportedly a result of the organization's environmental pollution or waste, intentional or otherwise.

Keep audit notes and audit report for 3 years

The original audit notations are strictly held by the auditors in confidence and shall not be made known to any party not authorized by the organization, with the exception of the DOE. The Lead Auditor shall also ensure that all the audit notes and reports are retained and kept securely to prevent loss and destruction for a period of three years.

The Audit Notes that are deemed confidential comprise of the:

- Audit checklist
- Audit evidence
- Documents (letters, drawings, procedures, data, records, etc) provided by the organization in the course of the audit
- Photographs
- Attendance list at the closing and opening meeting
- Summary Sheet of findings presented at the closing meeting

Where the audit report is to be made available to the public, the process information in such reports that are deemed as industrial patent or trade secret shall be deleted from the report in such form and extent to be agreed upon by the organization and DOE.

Corrective Action Report

6.1 Corrective Action Plan

An environmental compliance audit is a measure of the regulatory compliance status of an organisation or facility at the time of the audit and is an effective management tool only if the non-compliances are acted on as soon as possible. Therefore, the organization must demonstrate their commitment to comply with regulatory requirements by documenting their proposed corrective actions and submitting it to the DOE.

Organization prepares corrective action plan for '*Non-compliances*'

The corrective action plans to be submitted to the State DOE office are only required for regulatory '*Non-compliances*' that have been determined during the audit and it is not required for findings categorized as '*Observations*'. However, the organization is expected to resolve the '*Observations*' findings to ensure that it does not escalate to a '*Non-compliances*' *finding* in the future. The corrective action plan shall demonstrate that measures are in place to correct the non-compliance and to prevent the recurrence of the non-compliance.

The organization is expected to submit the *corrective action plan* using the Corrective Action Plan Report (CAR) format (see Appendix 9) to DOE within 21 calendar days after the audit (or as specified by DOE). For in compliances that require complicated solutions, the organization is still expected to submit the first response within the stipulated timeframe to indicate their proposed plan and stages of implementation.

6.2 Taking Corrective Action

The organization shall:

1. Carry out the corrective and preventive action promptly as per the corrective action plan submitted to the DOE.
2. Submit evidence of completion to DOE using the same Form CAR, when the corrective action is completed. Evidence of completion can include approvals, licences, before and after photos or other verifiable evidence e.g. effluent monitoring results, etc.

The corrective/preventive action plan may be easily incorporated into a structured Environmental Management System such as the ISO 14001:2004 standard which has an element prescribing the procedures for handling corrective and preventive action i.e. element 4.5.3 “Non-conformity, Corrective and Preventive Action”.

DOE shall:

1. Acknowledge receipt of proposed corrective action plan submitted via the CAR form.
2. Assess appropriateness of proposed corrective action detailed in the CAR form and revert with additional requirements if necessary.
3. Verify the completion of the corrective/preventive action and revert with additional requirements if the corrective/preventive action completed is unsatisfactory.

Environmental Risk Assessment

7.1 Overview of Risk Assessment

What is Environmental Risk Assessment?

In the Environmental Quality Act, 1974, **environmental risk** is defined as “*any risk, hazard or chances of bad consequences that may be brought upon the environment*”.

According to the European Environment Agency (EEA), **environmental risk assessment** (ERA) is the examination of risks resulting from technology that threaten ecosystems, animals and people. It includes human health risk assessments, ecological or ecotoxicological risk assessments, and specific industrial applications of risk assessment that examine end-points in people, biota or ecosystems.

In the developed countries, the development of environmental policy and regulation are shifting from hazard-based to risk-based approaches. A risk-based approach attempts to **examine the actual risks** imposed by an environmental issue rather than the **potential hazards** that may, or may not arise

Elements of Environmental Risk Assessment

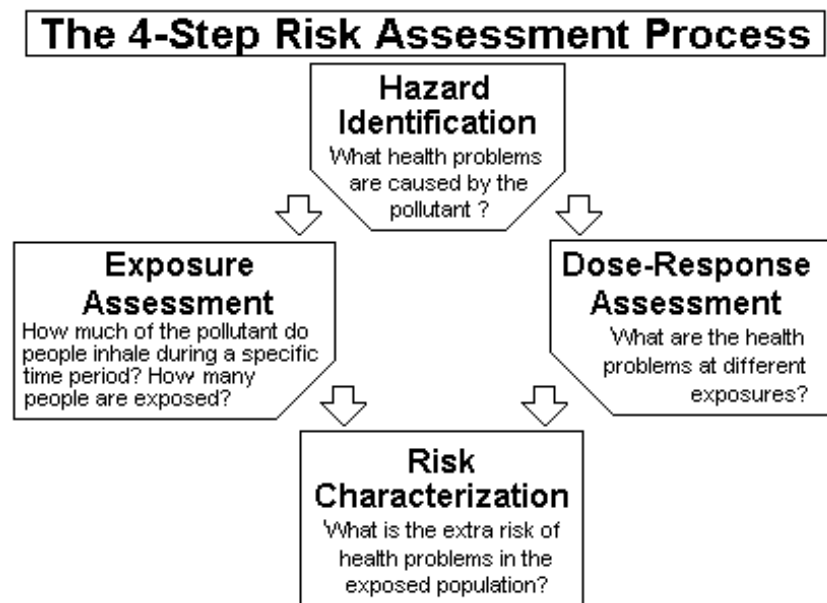
The ERA will examine the magnitude of the effect, the pathways and transport mode of the particular hazard/pollutant to the receptor and commonly uses predictive exposure modelling tools to determine the relative risk factors. The end receptor is usually defined which in the case of a human health risk assessment, the end receptor is the human population within the zone of impact while in an ecological risk assessment, the end receptor may be a particular plant or faunal species.

A risk assessment can also be applied to industrial risk assessment which determines the actual risks from an environmental contaminant present in and

around a site in order to manage the effects for minimal impact to the environment. This may be triggered by a detectable incident that results in the migration of a pollutant(s) into the surrounding environment or by public health complaints that point to an industrial pollutant source. In some cases where a public health effect has manifested, the source may be a long-term or continuous contamination event at the site or a non-routine industrial release.

One common approach used in defining a level of risk that is 'acceptable' and to assist in choosing between risk reduction options is the concept of ALARP (as low as is reasonably practicable). ALARP compares the costs of the risk existing with the costs that will be imposed by trying to reduce the risk. The risk needs to be reduced to as low as it is reasonably practicable.

The USEPA sees the risk assessment as a 4 step process which allows the regulators to determine the appropriate management required for environmental pollution caused by a particular pollutant and the parties that would be responsible for implementing the requirements.



Advantages of ERA

When the ERA is used as a management technique, it can be successful:

- as a mechanism to aid decision-making especially the choice between options of action, e.g. risk reduction option. Once you have determined the criteria on which choices are to be made, then risk assessment and management methods will aid decision-making;

- as a means of comparison between risks to determine whether there is equity that the action is proportionate to the risk;
- as they can break down complex systems and identify areas of processes or plant where risk reduction options can be most effective;
- as a basis for effective risk communication. Risk assessment can give a risk communicator the effective base for communication. However, the limitations are clear. If the communicator wishes to convince a sceptical public or other interest group, they will have to address the value issues that underlie the perception of the risk;

Disadvantages of ERA

The practice of ERA is usually surrounded by debates over the accuracy of the study due to the use of scientific techniques which encourage an over-reliance on and over-confidence in the results. This is particularly focused at risk areas where there are great uncertainties and conservative approaches and safety factors are common. Those who query the certainty of the science will often claim that reliance on risk assessments based upon uncertain science is ill-judged. The risk assessment focuses on parts of a problem rather than the whole. The most commonly performed risk assessments concentrate on single chemicals. Site-specific risk assessments may examine a number of risks but each will be done in isolation as the scientific data are not available for looking at mixtures of agents yet;

7.2 Examples of Risk Assessment

There are numerous types of environmental risk assessments and a few categories are briefly presented below to provide industry with some understanding of what may be required by the DOE when the organization is notified to conduct an Environmental Risk Assessment. Other types of risk assessments could include transport risk assessment, product risk assessment, waste management and others.

Air Pollution Monitoring and Modelling

A risk assessment for air pollutants combines the results of studies on the health effects of various animal and human exposures to the pollutant with results of studies that estimate the level of people's exposures at different distances from the source of the pollutant. The level of the pollutant is measured either at the source or in ambient air and the data is entered into air pollution models with other environmental factors to determine the dispersion.

There are a few levels of complexity defined for air quality measurements and air quality modelling. Level 1 is usually less sophisticated in the scope and technique of measurement as well as the modelling capability while Level 2 applies more

advanced techniques of air sampling and more complex models which require extensive meteorological data but which can produce scenarios closer to real life.

Level 1 air measurements are usually short-term spot samples that provide an immediate value but with a typical accuracy of only between 20 to 50%. The extent of measurement is also limited. In the Level 2 scope of air measurements, there is a longer term measurement utilizing more permanent monitoring equipment with a much higher accuracy, configured for multiple gases and equipment deployment that covers a physically wider location.

Level 1 air dispersion models are normally used as a preliminary screening tool because of the larger error range inherent in the model such as in SCREEN3 which models a single source and is unidirectional. Some examples of Level 2 air models are the US EPA model used to estimate concentrations from point, line and area sources such as ISCST3 (short term, <24h) and ISCLT3 (long term, >24h).

While the estimates provided by these risk assessments are far from perfect, they do help evaluate the risks associated with emissions of toxic air pollutants. Using risk estimates and other factors, regulatory action can be taken to reduce people's exposures to toxic air pollutants and reduce the risk of experiencing health problems.

Contaminated Land Assessment

The extent of soil and groundwater contamination at a site is usually determined by an environmental sampling and monitoring program which can be quite extensive and consequently quite costly. The scale of the monitoring program can be balanced out by minimizing the scope of the field exercise and employing computer models to determine the possible migration of the contaminant.

The computer-modelling approach is combined with methodologies that can predict human exposure to soil and groundwater contaminants via a range of potential exposure routes. For example, there is the RBCA Tool Kit for Chemical Releases, which is designed to meet the requirements of the ASTM Standard Guide for Risk-Based Corrective Action (E-1082) and the Groundwater Modelling System (GMS) which is used to perform groundwater simulations.

The Risk Based Corrective Action (RBCA) process assesses subsurface contamination associated with hydrocarbon releases. The RBCA Tool Kit combines contaminant transport models and risk assessment tools to calculate baseline risk levels and derive risk-based cleanup standards for a full array of soil, groundwater, surface water and air exposure pathways while GMS provides tools for every phase of groundwater simulation including site characterisation. Results from these models can be used in hazard assessment by comparing overall levels of exposure with occupational health and toxicological reference values.

Ecotoxicological Studies

Ecotoxicology is the study of toxic effects of chemicals on non-human organisms within an ecosystem at the individual, population, or community level. In order to qualitatively and/or quantitatively evaluate risks posed by contaminants to ecological resources, ecological risk assessments rely heavily upon the field of ecotoxicology. Ecological evaluations of risks from contaminants can also be beneficial in identifying exposure pathways for human populations. Thus, it is important for risk managers to be familiar with basic terminology and concepts from the field of ecotoxicology.

A range of laboratory bioassays can be used in monitoring programmes, assessing possible lethal and sub-lethal effects on organisms from different trophic levels, e.g. fish, invertebrates and algae. The species and number of bioassays used should be selected on a site-specific basis and determined by resources available. A tiered approach is generally best, where a rapid and simple screening test, such as a 48-hour acute toxicity test with an invertebrate, is used to identify priority areas. Some of the tests available include *Mysid* acute toxicity 96 hour LC₅₀ (ASTM E1463-92(2004)) or the amphipod 10-day survival (ASTM E1367-03e1)

New Zealand risk managers utilize the RAMAS ecotoxicology software to help undertake population-level ecological risk assessments for environmental contaminants. This computer model carries out ecological risk assessments for two broad systems structured single populations food chains. The model is used to manage variability and uncertainty, express results as ecological risks.

Glossary

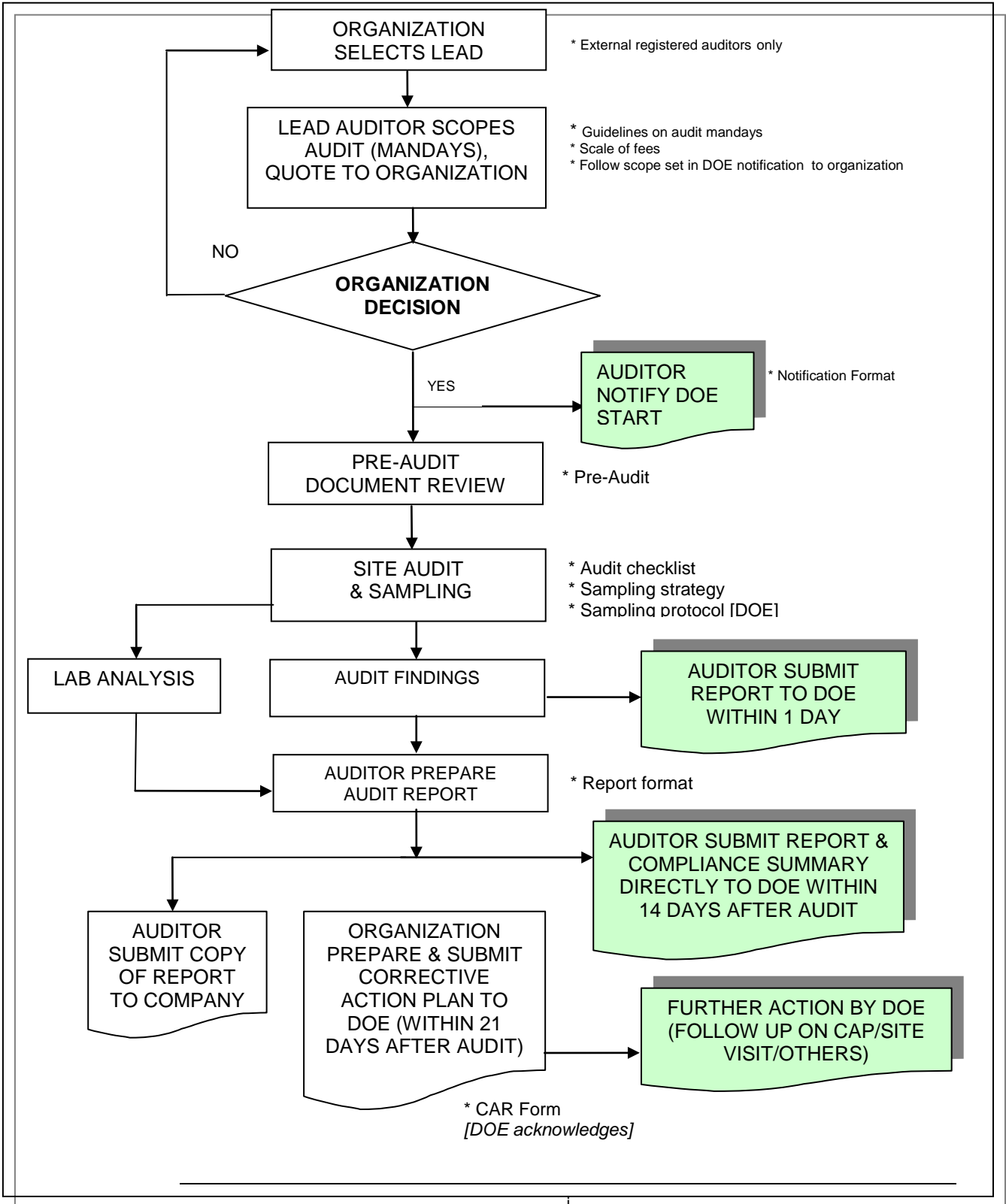
- **Auditee** – the organization which shall be audited and is the same as the “*occupier or owner directed or notified to carry out an environmental audit*” as defined in the regulation
- **Audit Assistant** – the auditor who is part of the audit team that undertakes the environmental audit and who is competent to conduct an audit
- **Auditor** – the auditor who is part of the audit team that undertakes the environmental audit, either as Lead Auditor or Audit Assistant.
- **Audit criteria** – standards, regulations, policies, procedures against which the audit is conducted
- **BAT** – Best Available Technology
- **Corrective action** – action to eliminate the cause of a detected non-compliance
- **Environmental Risk Assessment (ERA)** – an assessment of the environmental risks arising from a facility in areas such as air, water, soil and groundwater pollution.
- **Lead Auditor** – the registered auditor who is appointed to undertake the environmental audit and undersign the audit report.
- **Pollution Prevention** – Use of processes, practices, techniques, materials, products, services or energy to avoid, reduce or control (separately or in combination) the creation, emission or discharge of any type of pollutant or waste, in order to reduce adverse environmental impacts (as defined in ISO14001:2004) .
- **SME** – small and medium enterprise with paid up capital not more than RM25 million or less than 150 employees (as defined by MITI).
- **Preventive action** – action to eliminate the cause of a potential non-compliance

Reference

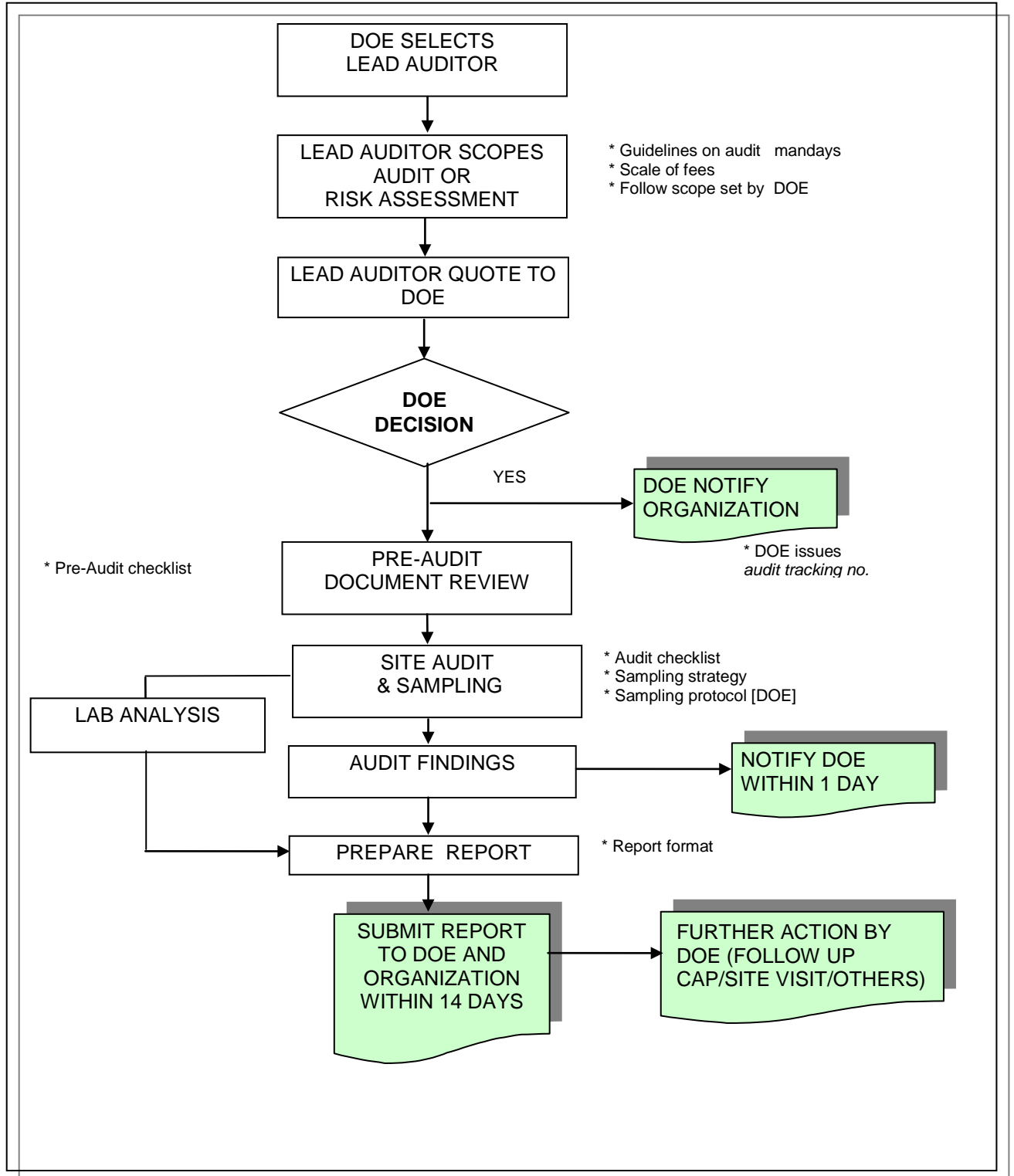
- *A Citizen's Guide to Risk Assessment and Public Health Assessment at Contaminated Sites*, www.atsdr.cdc.gov/publications/CitizensGuidetoRiskAssessments.html
- Allen, D.T., K.S. Rosselot, *Pollution Prevention for Chemical Processes*, Wiley-Interscience Publication, 1996
- Bishop, Paul, *Pollution Prevention: Fundamentals and Practice*, Waveland Press Inc., 2004
- Department of Environment Malaysia, *Environmental Quality Act 1974*, MDC Publishers Printers Sdn Bhd, 2000
- Department of Environment and Conservation NSW, *Compliance Audit Handbook*, revised 2006.
- Environment Australia, *Best Practice Environmental Management in Mining: Environmental Auditing*,
- European Environment Agency (EEA), *Environmental Risk Assessment: Approaches, Experiences and Information Sources* [webtext summary], <http://reports.eea.eu.int/GH-07-97-595-EN-C2/en/riskindex.html>
- Hong Kong Environmental Protection Department, *Hong Kong Monitoring and Audit Development Project*
- ISO19011 *Guidelines for Quality and/or Environmental Management System Auditing*. International Standards Organization, 2002.
- *Journal of Cleaner Production*, Elsevier Ltd.
- LaGrega, M. D., Buckingham, Evans, *Hazardous Waste Management*, McGraw-Hill, Inc., 1994

- Muhd. Awang et al (ed.), *'Environmental Auditing', Environmental Management Standard (ISO 14000): Towards a Sustainable Future*, Perpustakaan Negara Malaysia, 1999
- RAMAS Ecotoxicology, www.ramas.com
- *Risk Assessment for Contaminated Sites in New Zealand*, http://contamsites.landcareresearch.co.nz/old/risk_assessment_models_reviews.htm
- Reinhardt, F. L., *Down to Earth: Applying Business Principles to Environmental Management*, President and Fellow of Harvard College, 2000
- United Nations Environment Programme & World Health Organisation, *Pollution Prevention and Abatement Handbook, 1998: Toward Cleaner Production*, World Bank Publications, July 2000
- Worldwide number of ISO14001 certification <http://www.ecology.or.jp/isoworld/english>
- United Nations Cleaner Production Program, <http://www.uneptie.org/pc/cp/home.htm>
- US Environmental Protection Agency, *Risk Assessment for Toxic Pollutants – A Citizen's Guide*, http://www.epa.gov/oar/oaqps/air_risc/3_90_024.html
- United States Environmental Protection Agency, *The Small Business Source Book on Environmental Auditing*, May 2000

ENVIRONMENTAL AUDIT (AUDITOR APPOINTED BY ORGANISATION)



ENVIRONMENTAL AUDIT (AUDITOR APPOINTED BY DOE)



GUIDANCE FOR DETERMINATION OF AUDITOR MANDAYS

Table of recommended audit mandays (including audit preparation and reporting)

CONTINUUM Number of employees	High risk	Medium risk	Low risk
10	3 ± 1	2 ± 1	2 ± 1
30	5 ± 2	4 ± 2	3 ± 1
100	7 ± 2	6 ± 2	5 ± 2
500	9 ± 4	8 ± 2	6 ± 2
2000	10 ± 4	9 ± 2	7 ± 2

Note:

- High risk** – e.g. petrochemical, chemical, power generation, paper mill, metal foundry, mining, cement plant, scheduled waste prescribed premises, development or construction sites involving sensitive areas
- Medium risk** – e.g. semiconductor plant, manufacture of electrical household appliances, pharmaceutical, development or construction sites in non-sensitive areas, palm oil mill, metal fabrication, rubber glove, food and beverage processing, textile
- Low risk** – e.g. plantation, plastic injection moulding, packaging manufacturers

Risk categories defined here are in relation to the severity of the pollution with respect to potential exceedance of standard limits of discharge or emissions or in total pollutant loading. These **risk categories are only a guidance**. Consult DOE for further advice.

Adapted from ISO Guide 66 – ISO/IEC 17021:2006 “General Requirements for bodies operating assessment and certification/registration of environmental management systems (EMS)” (ISO Guide 66 will be phased out and replaced by ISO / IEC 17021:2006 in the year 2008)

Form A - NOTIFICATION OF AUDIT BY REGISTERED AUDITOR

Date of Notification: < Date >

Director,
Department of Environment,
<State Office Address or Headquarters Address>

Dear <Name of DOE officer in charge > ,

An environmental compliance audit will be conducted at the premises of the organization below.

Company Name: _____

Address: _____

Tel/Fax: _____

Date of Site Audit: _____
[See also Attachment 1 - Audit Plan]

AUDIT TRACKING NO: _____

I declare that I am not aware of any conflict of interest that would preclude me from conducting an environmental audit at the above premise.

<Name of Lead Auditor>
<Auditor Registration Number>
<Lead Auditor Contact Details>

[Department of Environment Use Only]

ACKNOWLEDGEMENT OF NOTIFICATION

DATE REPLY:

_____ < DOE Officer >

PRE-AUDIT CHECKLIST	
[Organization to submit to Lead Auditor within 14 calendar days]	
Organization Name: _____	
Address: _____	
Email/Tel/Fax: _____	
Date of Audit: _____	
PROJECT DESCRIPTION	Remarks
1. Business activities (provide process flow diagram)	
2. Diagram of premises (please attach site plan, layout)	
OVERALL ENVIRONMENTAL MANAGEMENT	Remarks
1. Environmental Policy Statement	
2. Organization's Environmental Management System (is there a system certified to or equivalent to the ISO14001?)	
3. Statement of the organization's objectives and targets	
4. Have there been any environmental remedial investigations or corrective actions taken at the premises?	
WATER SUPPLY MANAGEMENT	Remarks
1. Indicate the source of water supply at the premises	
2. What are the uses of water supplied?	
3. Describe any on-site potable/process water treatment system	
WASTEWATER MANAGEMENT	Remarks
1. List the sources of wastewater, type of discharge and daily volume	
2. Provide details of any licenses or applications	

PRE-AUDIT CHECKLIST	
[Organization to submit to Lead Auditor within 14 calendar days]	
<p>pertaining to water pollution control regulations [reference numbers and date issued, provide copy of conditions of approval]</p>	
<p>3. Describe type(s) of wastewater pre-treatment prior to discharge (e.g. oil separation, neutralisation, filtration, etc.)</p>	
<p>4. Indicate locations of all discharge points on the site layout</p>	
<p>5. Is any wastewater recycled? If so, describe briefly</p>	
<p>6. Describe any wastewater compliance monitoring programme.</p>	
WASTE MANAGEMENT	Remarks
<p>1. Provide details of internal classification, source, nature, quantity and frequency of waste generated</p>	
<p>2. Provide details of any licenses, permits or applications of file in relation to generation, storage, handling, disposal or transportation of these wastes. [reference numbers and date issued, provide copy of conditions of licence]</p>	
<p>3. Provide details of any on-site waste or disposal systems (i.e. type of waste disposal and capacity, type and quantity of waste disposed, etc.) for these wastes</p>	
<p>4. Briefly describe any current waste minimisation programmes (i.e. reduction, reuse, recycling)</p>	
AIR QUALITY MONITORING AND CONTROL	Remarks
<p>1. Indicate all significant sources of air emissions / pollutants</p>	
<p>2. Describe any ambient air monitoring programmes in place at the premises</p>	
<p>3. Describe any mitigation actions taken in the area with respect to air quality improvement</p>	

PRE-AUDIT CHECKLIST [Organization to submit to Lead Auditor within 14 calendar days]	
4. Provide details of any licenses or applications on file pertinent to ambient air quality regulations [reference numbers and date issued, provide copy of conditions of approval]	
NOISE MONITORING AND CONTROL	Remarks
1. Identify all operations or activities that may substantially elevate noise beyond normal premise background levels	
2. If applicable, describe any current practices to reduce noise levels at the premise	
3. Have there been any noise monitoring programmes undertaken at the premises?	
ENVIRONMENTAL IMPACT ASSESSMENT	Remarks
1. Was an environmental impact assessment conducted for the site? If yes, provide copy of Conditions of Approval.	

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST – GENERAL (USERS ARE RESPONSIBLE TO UPDATE BASED ON NEW REQUIREMENTS)

Audit site: _____
Audit date: _____
Auditor(s): _____

Issues	Remarks
GENERAL ISSUES	
1. How long has this facility been in operation?	
2. Does the facility have DOE approval to operate?	
3. Has this facility been inspected by DOE in the last year?	
4. Has this facility been cited for non-compliance in the last year? Historical records	
5. What pollution control equipment is used at this facility?	
AIR QUALITY	
1. Has this facility monitored the air emissions for compliance with air quality standard?	
2. Does this facility take all reasonable measures to prevent particulate matter from becoming airborne and to prevent the discharge of visible fugitive dust emissions beyond the facility's property line?	
3. Are control devices used to either reduce emissions or recover valuable by-product?	
4. Does this facility comply with the relevant prescribed permissible limits of air impurities?	
5. Does this facility possess a licence for chimneys located in the premises?	
6. Has this facility obtained a prior written approval for any or all of the fuel burning equipment rated to consume pulverised fuel or any solid fuel at 30kg or more per hour or any liquid or gaseous matter at 15 kg or more per hour?	
WATER QUALITY	

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST – GENERAL (USERS ARE RESPONSIBLE TO UPDATE BASED ON NEW REQUIREMENTS)

Audit site: _____
Audit date: _____
Auditor(s): _____

Issues	Remarks
1. Does this facility release any wastewater to the ground, stream, lake, pond or any other body of water? Is it greater than 60 m ³ ?	
2. Does this facility release any wastewater to sewer system?	
3. Where are wastewater discharge locations (point and non-point)?	
4. What is the design capacity of the wastewater treatment plant?	
5. What is the current volume of wastewater generated by this facility?	
6. What licences/approvals are in place for wastewater discharge?	
7. Does this facility have any required ground water monitoring programs?	
SCHEDULED WASTE MANAGEMENT	
1. Is there an updated scheduled waste inventory?	
2. What quantity of petroleum products / liquid chemicals is stored on site?	
3. Do any underground tanks exist on site?	
4. List monthly volumes and types of scheduled and non-scheduled waste generated at this facility.	
5. Are consignment notes in order?	
6. List and briefly describe each waste storage area.	
7. How long are wastes stored?	
8. Are wastes treated or disposed of on site?	
9. What waste streams are generated by this facility?	
10. Are the waste streams generated on a regular basis, or are they one-time events?	

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST – GENERAL (USERS ARE RESPONSIBLE TO UPDATE BASED ON NEW REQUIREMENTS)

Audit site: _____
Audit date: _____
Auditor(s): _____

Issues	Remarks
11. Which processes or operations generate the waste?	
12. Are wastes from different sources mixed?	
ENVIRONMENTAL MANAGEMENT SYSTEM	
1. Are responsibilities for environmental management clearly defined in the company?	
2. Is appropriate training provided to employees managing environmental issues?	
3. Are the environmental monitoring records organized and reliable?	
4. Are they prepared for large spills of chemicals?	
5. Is the storage and handling of chemicals done properly? Labelling, segregation, secondary containment, etc	
6. Do they have some form of procedures or work instructions related to activities where environmental impact may occur?	
7. Have they any records of previous incidents and have they documented the corrective and preventive action taken?	
8. What kind of reporting is made to the management on environmental matters and is this documented? Are the responses from management documented?	

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST – CLEAN AIR REGULATIONS 1978

Audit site: _____
 Audit date: _____
 Auditor(s): _____
 NO. _____

DOE AUDIT REF

Reference regulation	Requirements	Compliance/ Non-compliance	Remarks
ENVIRONMENTAL QUALITY (CLEAN AIR) REGULATIONS, 1978 (<i>Note: Standard A is no longer applicable</i>)			
Regulation 7 and 8: Burning of waste: Burning of trade waste in incinerator only Erection of incinerator to obtain prior approval	1. On-site or off-site burning done by owner or contractor? 2. Incinerator or open burning? 3. Burning (location, incinerator, etc.) approved by the DG?		
Regulation 14 – Permissible dark smoke limit for new facilities	1. Smoke emissions from any new facility except fuel burning equipment utilizing solid fuel should not be darker than that designated as shade No. 1 on the Ringelmann Chart, or 2. For fuel burning equipment utilizing solid fuel, the permissible limit shall be shade No. 2 on the Ringelmann Chart.		
Regulation 15 – Permissible dark smoke limit for existing facilities	1. For existing facilities, the permissible limit specified in regulation 14 shall be shade No. 2 on the Ringelmann Chart.		
Regulation 16 – Exceptions	1. Exemption from Regulations 14 and 15 if the emission of smoke is in aggregate less than 5 minutes in any period of one hour provided that the total period of such emissions shall not exceed an aggregate of 15 minutes in any period of twenty-four hours.		
Regulation 18 – Occupier to provide observation device	1. Notified by to install observation device? 2. Observation device in good order? E.g. remote installation of smoke density indicator and alarm, or unobstructed view of the top of the chimney from the control room; or mirror(s) so placed as to reflect the top of the opening or chimney; closed circuit television installation with the receiver located in the control room; or any other device that may be approved by the Director-General.		
Regulation 19 – Occupier to test and keep	1. Records of installation. Operation, maintenance and calibration of smoke density equipment and recorders		

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST – CLEAN AIR REGULATIONS 1978

Audit site: _____
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DOE AUDIT REF

Reference regulation	Requirements	Compliance/ Non-compliance	Remarks																													
ENVIRONMENTAL QUALITY (CLEAN AIR) REGULATIONS, 1978 (Note: Standard A is no longer applicable)																																
records	2. Records of volume and density of smoke generated																															
Regulation 24 –Solid particles concentration in heating of metals	1. Fuel burning equipment or industrial plant used for the heating of metals (other than cold blast foundry cupolas), the concentration of dust, soot, ash, grit and any solid particles before admixture with air shall not exceed: Standard B: 0.25 and Standard C: 0.2 gm/(Nm ³) of effluent gases.																															
Regulation 25 – Air Impurities : Solid particles concentration in other operations	1. Fuel burning equipment or industrial plant used for the heating of metals (other than plant or equipment used for heating of metals), the concentration of smoke, soot, dust, ash (including fly ash), cinders, cement, lime, alumina, grit or other solid particles of any kind before admixture with air shall not exceed: Standard B: 0.5, and Standard C: 0.4 gm/(Nm ³) of effluent gases.																															
Regulation 26 – Air Impurities : Metals and metallic compounds <i>[Note to auditor: Only list the heavy metals that are relevant to the site]</i>	1. The concentration heavy metals (gm/Nm ³) emitted shall not exceed:																															
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Substance</u></th> <th style="text-align: center;"><u>Standard A</u></th> <th style="text-align: center;"><u>Standard B</u></th> <th style="text-align: center;"><u>Standard C</u></th> </tr> </thead> <tbody> <tr> <td>Mercury</td> <td></td> <td style="text-align: center;">0.01</td> <td style="text-align: center;">0.01</td> </tr> <tr> <td>Cadmium</td> <td></td> <td style="text-align: center;">0.015</td> <td style="text-align: center;">0.015</td> </tr> <tr> <td>Lead</td> <td></td> <td style="text-align: center;">0.025</td> <td style="text-align: center;">0.025</td> </tr> <tr> <td>Antimony</td> <td></td> <td style="text-align: center;">0.025</td> <td style="text-align: center;">0.025</td> </tr> <tr> <td>Arsenic</td> <td></td> <td style="text-align: center;">0.025</td> <td style="text-align: center;">0.025</td> </tr> <tr> <td>Zinc</td> <td></td> <td style="text-align: center;">0.1</td> <td style="text-align: center;">0.1</td> </tr> <tr> <td>Copper</td> <td></td> <td style="text-align: center;">0.1</td> <td style="text-align: center;">0.1</td> </tr> </tbody> </table>			<u>Substance</u>	<u>Standard A</u>	<u>Standard B</u>	<u>Standard C</u>	Mercury		0.01	0.01	Cadmium		0.015	0.015	Lead		0.025	0.025	Antimony		0.025	0.025	Arsenic		0.025	0.025	Zinc		0.1	0.1	Copper
<u>Substance</u>	<u>Standard A</u>	<u>Standard B</u>	<u>Standard C</u>																													
Mercury		0.01	0.01																													
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Arsenic		0.025	0.025																													
Zinc		0.1	0.1																													
Copper		0.1	0.1																													
	2. For emissions of two or more of the above substances, the total mass of the first five shall not exceed 0.04 gm/Nm ³ or the sum of individual allowable limits, whichever less, and in addition, the individual limit as specified above shall not be exceeded.																															

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST – CLEAN AIR REGULATIONS 1978

Audit site: _____
 Audit date: _____
 Auditor(s): _____
 NO. _____

DOE AUDIT REF

Reference regulation	Requirements	Compliance/ Non-compliance	Remarks																		
ENVIRONMENTAL QUALITY (CLEAN AIR) REGULATIONS, 1978 (Note: Standard A is no longer applicable)																					
Regulation 27 – Air Impurities : Gaseous substances <i>[Note to auditor: Only list the substances that are relevant to the site]</i>	1. The concentration of the following gases shall not exceed the limits as shown in the Table:																				
	<table border="1"> <thead> <tr> <th>Substance Emitted</th> <th>Sources of Emission</th> <th>Standards</th> </tr> </thead> <tbody> <tr> <td>(a) Acid Gases</td> <td>Manufacture of sulphuric acid</td> <td>1. Equivalent of: Standard B: 6.0 Standard C: 3.5 gm SO₃/Nm³ of effluent gas 2. Effluent gas free from persistent mist</td> </tr> <tr> <td>(b) Sulphuric acid mist or sulphur trioxide or both</td> <td>Any source other than combustion process and plant for manufacture of sulphuric acid as in (a) above</td> <td>1. Equivalent of: Standard B: 0.25 Standard C: 0.2 gm SO₃/Nm³ of effluent gas 2. Effluent gas free from persistent mist</td> </tr> <tr> <td>(c) Chlorine gas</td> <td>Any source</td> <td>Standard B: 0.25 Standard C: 0.2 gm HCl/ Nm³</td> </tr> <tr> <td>(d) Hydrogen chloride</td> <td>Any source</td> <td>Standard B: 0.5 Standard C: 0.4 gm HCl/ Nm³</td> </tr> <tr> <td>(e) Fluorine, hydrofluoric acid, or inorganic</td> <td>Manufacture of aluminium from alumina</td> <td>Equivalent of: Standard C: 0.02 gm HF/ Nm³</td> </tr> </tbody> </table>	Substance Emitted	Sources of Emission	Standards	(a) Acid Gases	Manufacture of sulphuric acid	1. Equivalent of: Standard B: 6.0 Standard C: 3.5 gm SO ₃ /Nm ³ of effluent gas 2. Effluent gas free from persistent mist	(b) Sulphuric acid mist or sulphur trioxide or both	Any source other than combustion process and plant for manufacture of sulphuric acid as in (a) above	1. Equivalent of: Standard B: 0.25 Standard C: 0.2 gm SO ₃ /Nm ³ of effluent gas 2. Effluent gas free from persistent mist	(c) Chlorine gas	Any source	Standard B: 0.25 Standard C: 0.2 gm HCl/ Nm ³	(d) Hydrogen chloride	Any source	Standard B: 0.5 Standard C: 0.4 gm HCl/ Nm ³	(e) Fluorine, hydrofluoric acid, or inorganic	Manufacture of aluminium from alumina	Equivalent of: Standard C: 0.02 gm HF/ Nm ³		
	Substance Emitted	Sources of Emission	Standards																		
	(a) Acid Gases	Manufacture of sulphuric acid	1. Equivalent of: Standard B: 6.0 Standard C: 3.5 gm SO ₃ /Nm ³ of effluent gas 2. Effluent gas free from persistent mist																		
	(b) Sulphuric acid mist or sulphur trioxide or both	Any source other than combustion process and plant for manufacture of sulphuric acid as in (a) above	1. Equivalent of: Standard B: 0.25 Standard C: 0.2 gm SO ₃ /Nm ³ of effluent gas 2. Effluent gas free from persistent mist																		
	(c) Chlorine gas	Any source	Standard B: 0.25 Standard C: 0.2 gm HCl/ Nm ³																		
(d) Hydrogen chloride	Any source	Standard B: 0.5 Standard C: 0.4 gm HCl/ Nm ³																			
(e) Fluorine, hydrofluoric acid, or inorganic	Manufacture of aluminium from alumina	Equivalent of: Standard C: 0.02 gm HF/ Nm ³																			

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST – CLEAN AIR REGULATIONS 1978

Audit site: _____

Audit date: _____

Auditor(s): _____

NO. _____

DOE AUDIT REF

Reference regulation	Requirements				Compliance/ Non-compliance	Remarks
ENVIRONMENTAL QUALITY (CLEAN AIR) REGULATIONS, 1978 (Note: Standard A is no longer applicable)						
	fluorine compound					
	(f) Fluorine, hydrofluoric acid, or inorganic fluorine compound	Any source other than manufacture of aluminium from alumina as in (e) above	Equivalent of: Standard B: 0.125 Standard C: 0.100 gm HF/ Nm ³			
	(g) Hydrogen sulphide	Any source	Standard B: 5.00 Standard C: 5.00 ppm vv			
	(h) Oxide of nitrogen	Manufacture of nitric acid	1. Equivalent of: Standard B: 4.60 Standard C: 1.7 gm NO _x / Nm ³ 2. effluent gas substantially colourless			
	(i) Oxides of nitrogen	Any source other than combustion processes and manufacture of nitric acid as in (h) above	Equivalent of: Standard B: 2.5 Standard C: 2.0 gm NO _x / Nm ³			
Regulation 28 – Air Impurities: Asphalt concrete plant	1. Dust or solid particles from asphalt concrete plant and bituminous mixing plant shall not exceed:					
	<u>Source</u>	<u>Standard A</u>	<u>Standard B</u>	<u>Standard C</u>		
	Stationary Plant		0.4 gm/Nm ³	0.3 gm/Nm ³		

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST – CLEAN AIR REGULATIONS 1978

Audit site: _____
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 NO. _____

DOE AUDIT REF

Reference regulation	Requirements	Compliance/ Non-compliance	Remarks				
ENVIRONMENTAL QUALITY (CLEAN AIR) REGULATIONS, 1978 (Note: Standard A is no longer applicable)							
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Mobile Plant</td> <td style="width: 25%;"></td> <td style="width: 25%;">0.7 gm/Nm³</td> <td style="width: 25%;">0.4 gm/Nm³</td> </tr> </table>	Mobile Plant		0.7 gm/Nm ³	0.4 gm/Nm ³		
Mobile Plant		0.7 gm/Nm ³	0.4 gm/Nm ³				
Regulation 29 – Air Impurities: Portland cement plant	1. Cement dust or solid particles shall not exceed:						
	<u>Source</u>	<u>Standard A</u>	<u>Standard B</u>				
	Kiln		0.2 gm/Nm ³				
	Clinker cooler, finish grinding and other		0.1 gm/Nm ³				
Regulation 30 – Air Impurities: Facilities discharging asbestos and free silica	1. Discharges of dust or any solid particles containing asbestos or free silica shall not exceed: Standard B: 0.2 and Standard C: 0.12 gm/Nm ³						
Regulation 32- Air Impurities: Occupier to use best practicable means	1. Does facility generate noxious or offensive substances (Third Schedule). 2. Does facility render harmless and inoffensive those substances necessarily discharged by best practicable means e.g. mist eliminator, dust arrestor, gas absorber and control instrumentation; use of suitable raw material or suitable fuel; alternative process or alternative manner of operation; regular and efficient maintenance of plant and control equipment.						
Regulation 33 – Air Impurities: Abatement of offensive odours	1. Does the facility generate offensive or unwholesome odour? 2. Has DOE notified owner to comply with requirements? 3. Does owner comply with requirements?						
Regulation 35 – Air Impurities: Unburnt waste and ash from incinerator	1. Can unburnt waste or ash from any incinerator be visible in the atmosphere?						

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST – CLEAN AIR REGULATIONS 1978

Audit site: _____
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DOE AUDIT REF

Reference regulation	Requirements	Compliance/ Non-compliance	Remarks
ENVIRONMENTAL QUALITY (CLEAN AIR) REGULATIONS, 1978 (<i>Note: Standard A is no longer applicable</i>)			
Regulation 36- Air Impurities: Erection of fuel burning equipment	1. How many fuel burning equipment (FBE) are there (that is rated to consume pulverized/solid fuel at > 30kg/hour or any liquid or gaseous matter at >15kg/hour)? 2. Has prior written approval been obtained for each FBE?		
Regulation 38 – Air Impurities: Erection etc. of chimney	1. How many chimneys are installed in the facility? 2. Do all chimneys have prior approval? Do alterations and resiting of chimneys have approval? 3. Check site plan, approved discharge rate, concentrations and quantities, construction drawings (certified by PE), design parameters and calculations		
Regulation 40 – Air Impurities: Control equipment to be in operation	1. Is control equipment in proper operation? 2. If not, has permission been obtained from DG to continue operating the plant?		
Conditions of Approval	1. Check the Conditions of Approval and determine if all conditions have been met for e.g. <ul style="list-style-type: none"> • validity period of the Conditions of Approval • monitoring parameters and frequency • reporting to DOE • notification of changes • etc. 		

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST – SEWAGE AND INDUSTRIAL EFFLUENT REGULATIONS 1979 (USERS ARE RESPONSIBLE TO UPDATE BASED ON NEW REQUIREMENTS)

Audit site: _____
 Audit date: _____
 Auditor(s): _____
 NO. _____

DOE AUDIT REF

Reference regulation	Requirements	Compliance/ Non-compliance	Remarks
ENVIRONMENTAL QUALITY (SEWAGE AND INDUSTRIAL EFFLUENTS) REGULATIONS, 1979			
Regulation 4 and 5 – New sources of discharge: Prohibition against new and altered sources of effluent discharge Requirement and approval of plans	1. Does facility have permission for effluent discharge 2. Does facility have permission for alterations in effluent discharge due to new construction or facility at site. 3. Is facility complying with monitoring programs or control equipment required by DOE?		
Regulation 6 – Acceptable conditions of discharge into inland waters: Prohibition of discharge of effluent containing certain substance	1. Are the inland waters (drains, etc.) clear of any inflammable solvent, tar or other liquids immiscible with water, refuse, garbage, sawdust, timber, human or animal waste or solid matters		
Regulation 8 – Acceptable conditions of discharge into inland waters: Parameter limits of effluent to be discharged into inland waters	1. Which Standard is the facility complying to? Std A or B? 2. Does the facility comply with the Standard? 3. Where two or more metals specified as parameters (xii) to (xvi), are present in the effluent, the concentration of these metals shall not be greater than – (a) 0.5 mg/L in total, where Standard A is applicable; (b) 3.0 mg/L in total, and 1.0 mg/L in total for soluble forms, where Standard B is applicable. 4. Where Standard B is applicable and when both phenol and free chlorine are present in the same effluent, the concentration of phenol individually, shall not be greater than 0.2 mg/L and the concentration of free chlorine individually, shall not be greater than 1 mg/L		

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST – SEWAGE AND INDUSTRIAL EFFLUENT REGULATIONS 1979 (USERS ARE RESPONSIBLE TO UPDATE BASED ON NEW REQUIREMENTS)			
Audit site: _____ Audit date: _____ Auditor(s): _____ NO. _____		DOE AUDIT REF	
Reference regulation	Requirements	Compliance/ Non-compliance	Remarks
ENVIRONMENTAL QUALITY (SEWAGE AND INDUSTRIAL EFFLUENTS) REGULATIONS, 1979			
Regulation 9 – Discharge of effluent and sludge onto land: Restriction on the discharge of effluents	1. Has the facility discharged any effluent in or on any soil or surface of any land without prior written permission		
Regulation 10 – Discharge of effluent and sludge onto land: Restriction on disposal of sludge	1. Has the facility discharged any solid waste or sludge that is generated from any production or manufacturing processes or from any effluent treatment plant in or on any soil or surface of any land without the prior permission?		
Regulation 11 – License for contravention of acceptable conditions: Acceptable conditions which may be contravened	1. Do the monitoring results or observations indicate that the facility has not complied with approved conditions of discharge or Standard A/B? 2. Does facility have contravention license for the non-complying discharge?		
Regulation 16 – Points of Discharge	1. Have the point(s) of discharge of effluent been notified to DOE and approved? 2. Have alterations to the position and design of the discharge outlet been notified to DOE and approved?		
Regulation 17 – Dilution of effluent	1. Is there a practice of diluting effluent prior to discharge? 2. Has written approval been obtained from DOE for this and are they following the approval conditions?		
Regulation 18 - Spill or accidental discharge	1. Have there been any spills or accidental discharge of the substances specified in regulation 8 which either directly or indirectly gains or may gain access into any inland waters? 2. Have they notified DOE of the spill immediately?		

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST – SEWAGE AND INDUSTRIAL EFFLUENT REGULATIONS 1979 (USERS ARE RESPONSIBLE TO UPDATE BASED ON NEW REQUIREMENTS)

Audit site: _____
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 NO. _____

DOE AUDIT REF

Reference regulation	Requirements	Compliance/ Non-compliance	Remarks
ENVIRONMENTAL QUALITY (SEWAGE AND INDUSTRIAL EFFLUENTS) REGULATIONS, 1979			
	3. Have they cleaned up the spill or accidental discharge or substances in a manner satisfactory to the DOE?		
<u>Conditions of Approval</u>	2. Check the Conditions of Approval and determine if all conditions have been met for e.g. <ul style="list-style-type: none"> • validity period of the Conditions of Approval • monitoring parameters and frequency • reporting to DOE • notification of changes • Approval letter and conditions of approval have been posted prominently at the location • etc. 		

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST

Audit site: _____
 Audit date: _____
 Auditor(s): _____
 NO. _____

DOE AUDIT REF

Reference regulation	Guidance	Compliance/ Non-compliance	Remarks
ENVIRONMENTAL QUALITY (SCHEDULED WASTE) REGULATIONS, 2005			
Regulation 3 – Notification of the generation of scheduled wastes	1. The generation of scheduled waste has been notified to the DOE (using format in Second Schedule) within 30 days of its generation? 2. Check if waste codes are correctly assigned. 3. Are there any waste that have not been notified to DOE? (including new categories and quantities of waste generated as a result of any alteration at the plant)		
Regulation 4 – Disposal of Scheduled Wastes	1. Is scheduled waste disposed of, at a prescribed premise? 2. Do they have copies of the latest valid licence from the prescribed premise?		
Regulation 5 – Treatment of scheduled wastes	1. Is scheduled waste treated at a prescribed premise or at on-site treatment facility? 2. Do they have copies of the latest valid licence from the prescribed premise? 3. Are the residuals from the treatment of scheduled waste disposed to prescribed premise?		
Regulation 6 – Recovery of material or product from scheduled waste	1. Is scheduled waste recovery done at a prescribed premise or at on-site recovery facility? 2. Do they have copies of the latest valid licence from the prescribed premise? 3. Are the residuals from the recovery of scheduled waste disposed to prescribed premise?		
Regulation 7 – Application for special management of scheduled wastes	1. Has application been submitted in writing to DOE prior to implementing special management? 2. Has DOE issued approval? 3. Did the approval come with conditions? What are the conditions and		

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST

Audit site: _____
 Audit date: _____
 Auditor(s): _____
 NO. _____

DOE AUDIT REF

Reference regulation	Guidance	Compliance/ Non-compliance	Remarks
ENVIRONMENTAL QUALITY (SCHEDULED WASTE) REGULATIONS, 2005			
	do they comply with the conditions		
Regulation 8 – Responsibility of waste generator	1. Is there any scheduled waste that has not been properly stored, treated on-site, recovered on-site or not been sent to a licensed facility for storage/treatment/recovery? 2. Are the scheduled waste that are to be moved or transferred out of the plant properly packaged, labeled, and transported?		
Regulation 9 – Storage of scheduled wastes	1. Are scheduled wastes stored in containers which are durable and which are able to prevent spillage or leakage of the scheduled wastes into the environment? 2. Are containers clearly labelled in accordance with the Third Schedule? 3. Are incompatible scheduled wastes stored in separate containers and in separate secondary containment areas? 4. Are the containers of scheduled waste always closed except where necessary to add or remove the scheduled waste? 5. Are the areas for the storage of the containers designed, constructed and maintained adequately to prevent spillage or leakage of scheduled wastes into the environment? 6. Has scheduled waste been stored > 180 days and/or > 20 tonnes? If so, is there approval letter from DOE?		
Regulation 10 – Labelling of Scheduled Waste	1. Do labels on scheduled waste containers at the central storage locations have <ul style="list-style-type: none"> ▪ date generated, ▪ name, telephone number and address of waste generator, ▪ First Schedule waste code, ▪ Third Schedule hazard signage 		

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST

Audit site: _____
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DOE AUDIT REF

Reference regulation	Guidance	Compliance/ Non-compliance	Remarks
ENVIRONMENTAL QUALITY (SCHEDULED WASTE) REGULATIONS, 2005			
<u>Regulation 11</u> – Waste generator shall keep an inventory of scheduled wastes	1. Is scheduled waste inventory (Fifth Schedule) accurate and up-to-date on the quantities and categories of scheduled wastes being generated, treated and disposed of? 2. Have they kept records for at least 3 years? 3. Can the inventory be reconciled with the consignment notes for the last 3 years? 4. Can the inventory be reconciled with quantity generated and/or stored at site for the last 3 years?		
<u>Regulation 12</u> – Information to be provided by waste generator, contractor and occupier of prescribed premises	1. Does the waste generator have both its own copy of the Sixth Schedule and the copy from the licensed facility? 2. Have they sent the copy to DOE within 30 days of the scheduled waste transported out of the site? 3. Have they taken action if the consignment note has not been returned from the licensed facility within 30 days? 4. Have the consignment notes been kept for at least 3 years?		
<u>Regulation 13</u> – Scheduled waste transported outside waste generator’s premises to be accompanied by information	1. Has the waste generator prepared information in accordance with the Seventh Schedule in respect of each category of scheduled wastes to be delivered to the contractor and informed the contractor of this information.		
<u>Regulation 15</u> – Conduct	1. Is the staff involved in identification, handling, labelling, transportation, storage, spillage or discharge response properly trained?		
<u>Conditions of Approval</u>	1. Check the Conditions of Approval and determine if all conditions have been met for e.g. <ul style="list-style-type: none"> • validity period of the Conditions of Approval 		

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST

Audit site: _____
 Audit date: _____
 Auditor(s): _____
 NO. _____

DOE AUDIT REF

Reference regulation	Guidance	Compliance/ Non-compliance	Remarks
ENVIRONMENTAL QUALITY (SCHEDULED WASTE) REGULATIONS, 2005			
	<ul style="list-style-type: none"> • volume of scheduled waste generated does not exceed allowed volume • monitoring parameters and frequency • reporting to DOE • etc. 		

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST – CONSTRUCTION SITES

Audit site: _____
 Audit date: _____
 Auditor(s): _____
 NO. _____

DOE AUDIT REF

EIA Conditions	Requirements	Compliance/ Non-compliance	Remarks
EARTHWORKS	1. Is site clearing confined within construction limit of project site? (Complete clearing is not recommended) 2. Are cleared vegetation and biomass disposed at the disposal sites approved by S.O.? (As much natural vegetation should be retained where possible to assist in slope protection and minimize surface soil erosion e.g. provision of green belt) 3. Are general work areas sited adjacent to water bodies? If Yes, are mitigating measures provided? (e.g. gabions, sediment traps, etc) to control water pollution.		
EROSION & SEDIMENT CONTROL PLAN (ESCP), [SLOPE PROTECTION & MAINTENANCE]	1. Is an ESCP a requirement? If Yes, was the ESCP approved by JPS? 2. Is the ECSP prepared effective? Does it require revision? 3. Are completed slopes protected by temporary protection / covers before turfing or hydroseeding? 4. Is erosion from exposed slopes (which have not reached their formation) being mitigated? 5. Are all exposed slopes protected from erosion through the implementation of acceptable soil stabilization practices? (Refer geotechnical report if any) 6. Is regular maintenance carried out to turfed or hydroseeded slopes? 7. Are all temporary stockpiles or construction materials located in approved areas and protected from erosion? 8. Is there a routine slope maintenance inspection checklist and is it implemented?		
ESCP – [CONSTRUCTION & MAINTENANCE OF	1. Are sediment traps / ponds / basins / silt fences / silt curtains adequately sized to maximize retention time and allow water discharge to be directed through an overflow weir / perforated pipe and into rock gabion? 2. Are all sediment traps, ponds, barriers and basins maintained and		

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST – CONSTRUCTION SITES

Audit site: _____
 Audit date: _____
 Auditor(s): _____
 NO. _____

DOE AUDIT REF

EIA Conditions	Requirements	Compliance/ Non-compliance	Remarks
SEDIMENT TRAPS / PONDS / BASINS]	functioning properly? (Desilted materials shall be transported to designated disposal sites) 3. Is sediment, debris or mud being cleaned from public roads that intersect with site access roads?		
DRAINAGE WORKS	1. Are drains for all cut and fill slopes constructed immediately / as per plan to prevent soil erosion and formation of gullies? If not as per plan, are mitigation measures provided? 2. Are surface and storm water runoff from the work sites channeled into drains and finally into the sediment traps / ponds before discharge into waterways? 3. Are drains provided maintained? (Cleaned / repaired whichever necessary)		
WATER POLLUTION, SANITATION	1. Is adequate sanitation provided for the main office, construction areas, worker's accommodation? 2. Is there any direct discharge of untreated sewage and sullage into drains or waterways from the project site? 3. Is there any discharge of oil and grease or any noticeable pollutant into any watercourses or on the ground?		
AIR POLLUTION	1. Is there evidence of open burning activity carried out on site? (e.g. biomass and solid wastes such as construction debris are strictly not permitted on site - Refer EQ (Clean Air) Regulation 1978 Regulation 7) 2. Are there air pollution control measures carried out along / at identified locations? (e.g. regular spraying of water using water browsers over the temporary access and logistic roads and other barren areas of the site including at batching plants. All materials and equipment used properly to be covered) 3. Is sediment, debris or mud being cleaned from public roads, intersected with site access roads?		

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST – CONSTRUCTION SITES

Audit site: _____
Audit date: _____
Auditor(s): _____
NO. _____

DOE AUDIT REF

EIA Conditions	Requirements	Compliance/ Non-compliance	Remarks
NOISE POLLUTION	1. Are mitigation measures provided to control noise pollution? (e.g. high noise emitting plant and equipment should be enclosed to reduce noise emission as per regulatory requirements - Leq 65 dB(A) during daytime and Leq 55 dB(A) during night-time or as specified in the EIA conditions)		
ENVIRONMENTAL MONITORING AND AUDITING	2. Is there a monitoring / audit program prepared? 3. Is flora and / or fauna survey during stipulated interval a requirement? If Yes, has it been conducted? 4. Is a quarterly audit of the site by independent auditor carried out for regulatory or as per contract requirement? 5. Is water quality monitoring carried out at all discharge points of the sediment traps / ponds / basins and water storage tank(s)? This also includes upstream and downstream of all streams within construction site and at specified locations. Do the results comply with requirements? 6. Is air quality monitoring carried out at specified locations? (e.g. adjacent to sensitive receptor such as school, hospital, settlement) Do the results comply with requirements? 7. Is noise monitoring carried out at specified locations? (e.g. near existing settlements including Orang Asli). Do the results comply with requirements? 8. Were monitoring (water, air and noise) carried out by qualified personnel and were testing of samples done in accredited laboratory? 9. Are monitoring and audit reports sent to interested parties as per specified frequency?		
NON-SCHEDULED WASTE MANAGEMENT	1. Are proper on-site collection bins provided at site camp to prevent odour and reduce presence of vectors? 2. Are general solid wastes, construction debris and rubbish collected regularly and removed by contractor to an approved waste disposal site? If Yes, request evidence (e.g. contract)		

ENVIRONMENTAL COMPLIANCE AUDIT CHECKLIST – CONSTRUCTION SITES

Audit site: _____
 Audit date: _____
 Auditor(s): _____
 NO. _____

DOE AUDIT REF

EIA Conditions	Requirements	Compliance/ Non-compliance	Remarks
SCHEDULED WASTES	1. Is waste oil collected in drums, sealed, stored and labeled properly and disposed off-site by licensed contractor as per EQ (Scheduled Wastes) Regulations 2005? (Emphasize on Regulations 3, 8, 9, 10 & 11) 2. Are all material handling and storage areas clean and free of spill, leaks or any other deleterious materials? 3. Is there any scheduled waste disposed on site by burial or discharged into any watercourses?		
DISPOSAL AREAS	1. Is there a Method Statement submitted? 2. Are there approvals from Land Office, consultant and JKR? 3. Are engineered fill embankments (if specified in contract) provided with environmental protection measures as per specifications? (e.g. surface erosion protection, drainage, landscape etc)		
MACHINERY YARD	1. Is there a skid tank? f Yes, is the skid tank bunding adequate? 2. Are all material handling, storage and repair areas clean and free of spills, leaks or any other deleterious materials?		
EMERGENCY RESPONSE & PREPAREDNESS	1. Is there an ERP team established on site for emergency situation (e.g. chemical, or oil tank spillage) 2. Have there been any environmental incidences on site? If yes, has a report been prepared and sent to interested parties?		
OTHERS	1. Is EIA conditions of approval displayed at appropriate location? Have there been any appeals to change the conditions and are the new conditions complied with? 2. Is the EMP approved by DOE? Has the EMP been reviewed to adapt to site conditions? 3. Check the followings- roles & responsibilities for environmental management clearly defined? Training provided to manage issues? Are records organized and maintained?		

AUDIT FINDINGS SUMMARY SHEET [sample]

DOE Audit Tracking Number:	JAS File No/ Bil Audit/Tahun Dilaksana
Organization:	AP Petro Plastics Sdn Bhd
Audit Location/Address:	Lot 125, Jalan Kilang BMB Industrial Estate Johor, 86000
Audit Site Visit Date:	January 25 – January 26 2009

GOOD PRACTICES

- The facility has been conducting comprehensive monthly monitoring of river water, discharge, air emissions, and groundwater.
- The Phase 1 facility has applied for and obtained Written Approvals for specific equipment such as the waste water treatment plant, and the boilers 1 and 2 and associated bag filters.
- Housekeeping around the waste water treatment plant is reasonably clean.

OBSERVATIONS

- The new scheduled waste store is not indicated on the plant layout and the grass has overgrown into the spill drain.
- The roof in the dosing room at the Water Treatment Plant is leaking.
- The labeling for the boiler chimney has faded.

NON-COMPLIANCES

No.	Regulation or COA Title/Reference	Regulation or COA number	Description of Non-compliance
1.	EQ (Clean Air) Regulation 1978	Reg 36	The auxiliary boiler has no written approval and there is no evidence that the application has been made
2.	EQ (Clean Air) Regulation 1978	Reg 36	The start-up generator has no written approval however, an application has been submitted to DOE on the 15 th of December, 2006.
3.	EQ (Clean Air) Regulation 1978	Reg 40	The CEMS system for chimney no. 2 has not been operational since 3 rd January, 2005. The organization is in the process of selecting the

No.	Regulation or COA Title/Reference	Regulation or COA number	Description of Non-compliance
			contractor to undertake the rectification works.
4.	EIA Conditions of Approval (JAS/xxx/001)–	COA no. 2	The new moulding line has not been notified to DOE and hence approval has not been obtained for this operation.
5.	EQ (Scheduled Waste) Regulation 2005	Reg 3	Notification to DOE has not been done for empty chemical drums, contaminated rags, electronic waste
6.	EQ (Scheduled Waste) Regulation 2005	Reg 4, 5, 6, 11	Contaminated rags and electronic waste are disposed as normal waste and empty chemical drums are sent back to the supplier. These wastes are not reflected in the inventory
7.	EQ (Scheduled Waste) Regulation 2005	Reg 12, 13	There's no delivery and receiving date or waste code on the consignment note for 30 drums of waste oil delivered to ABC Sdn Bhd. No evidence of scheduled waste characteristics information given to scheduled waste contractor transporter, ABC Sdn Bhd

Comments from AP Petro Plastics Sdn Bhd

1. The application for approval of the generator has been submitted to DOE and are now awaiting the response from DOE.
2. Empty chemical containers are sent back to suppliers. They will provide evidence of the contractual agreement with the suppliers.

We acknowledge that the findings of the audit have been presented to the management of AP Petro Plastics Sdn Bhd.

Miriam Zainuddin
Lead Auditor

Mr. K. Nayappan
Managing Director
AP Petro Plastics Sdn Bhd

Date: _____

Date: _____

AUDIT REPORT [SAMPLE]**A. AUDIT SITE ADMINISTRATIVE DETAILS [sample]**

DOE Audit Tracking Number:	JAS/XX/201/456
Organization:	ABC Power Station
Audit Location/Address:	Lot 125, Jalan Kilang BMB Industrial Estate Johor, 86000
Organization representative:	Mr. K. Nayappan – Managing Director Encik Mohamad Abdullah – Plant Manager Mr. Lim J J – Environment Officer Mr. Len Albee– Ash Pond Mr. Chang K C – Water Treatment Encik Daud Zubir– Boiler, coal yard Mr. Chen Y C – Scheduled Waste Store
Audit Scope/Areas:	Ash pond, boiler, coal yard, waste water treatment plant, scheduled waste store, cooling water intake and discharge, laboratory,
Audit Criteria:	EQA 1974 and subsidiary regulations
Audit Site Visit Date:	January 25 – 26, 2009

Date of Report:	February 2 nd , 2009
Lead Auditor: (Name) (Registration Number) (Signature)	Miriam Zainuddin EA 001
Auditors:	Ms. Lee Swee Lin Mr. Hatta Mohamed Nor

AUDIT REPORT [SAMPLE]

B. REGULATORY COMPLIANCE SUMMARY [sample]

Regulation or COA Title/Reference	Regulation or COA Number	Number of non-compliances
EQ (Clean Air) R '78	Reg 36	2
	Reg 42	1
EQ (Scheduled Waste) R '05	Reg 5	2
	Reg 15	1
EQ (Refrigerant Management) R '99	Reg 5	1
Conditions of Approval (EIA) – <u>JAS/xxx/001</u>	COA # 3	1
	COA # 15	1
Conditions of Approval (EMP) – <u>JAS/abc/003</u>	COA # 1	1
Conditions of Approval (Written Approvals) – <u>JAS/bbb/004</u>	COA # 10	1
Conditions of Licence – <u>JAS/xyz/008</u>	COA # 2	1
	COA # 3	2
etc. other regulations or requirements as applicable		
TOTAL	12	15

Note:

- For each applicable non-compliance, cite the Regulation and the Regulation number
- **COA** – Conditions of Approval
- Compliance in process will be registered under the Non-compliance column but to be annotated with the appropriate remark in the audit report
- The main audit report will contain the detailed findings corresponding to the non-compliances that are summarized here

AUDIT REPORT [SAMPLE]

C. MAIN REPORT [suggested content]

- Audit Finding Summary Sheet presented at the closing meeting and signed by the organization
- Environmental control equipment compliances such as valid licences, conditions that are conformed with, etc.
- Environmental Sampling Results (if any was done during the audit)
- Add additional non-compliances (if any) for the Environmental Sampling Results
- Additional notations /explanations on the audit findings if pertinent and of material value
- Recommendations for the Non-compliances found
- A statement of the confidential nature of the contents of the audit report

D. ATTACHMENTS

- Updated site layout plan showing key activities/processes, pollution control equipment, effluent discharge points, etc
- Attendance list – audit opening and closing meeting
- Photos of observable non-compliances at the site
- Laboratory results of environmental sampling
- Any other pertinent information
- Confidentiality Statement

Confidentiality Statement

All information contained in this audit report and its associated audit notations is confidential and may not be disclosed to any party other than the receiving party in the Department of Environment and the receiving party in the audited premise.

Auditors are prohibited from providing public comment on the audit contents or matters pertaining to the audited premise.

I have read and understand the confidentiality statement. I understand that it is a condition of my participation in the audit to adhere to the confidentiality statement, and that violation of this rule may result in auditor deregistration or non-registration.

SIGNATURE

Lead Auditor: _____

Auditor Registration No: _____

Audit Assistant: _____

Etc.

CORRECTIVE ACTION REPORT*(to be prepared by Organization and submitted to DOE within 21 calendar days of the site audit)**[Sample contents shown below]*

DOE Audit Tracking Number:	JAS/XX/201/456	Organization:	AP Petro Plastics Sdn Bhd
Audit Date:	January 25 – 26, 2009	Audit Location:	Lot 125, Jalan Kilang, BMB Industrial Estate Johor, 86000

No.	Regulation or COA citation Non-compliance	Proposed CAR	Proposed Completion Date	DOE Remark
1.	<i>EQ (Clean Air) Regulation 1978 - Reg 36</i> <i>The auxiliary boiler has no written approval and there is no evidence that the application has been made</i>	<ul style="list-style-type: none"> - <i>To compile engineering specifications and drawings of the boiler.</i> - <i>To conduct air quality monitoring for the boiler chimney – SOX, NOX, TSP</i> - <i>To fill in and submit Form XXX along with the specifications / drawings and monitoring results.</i> 	<i>February 28, 2009</i>	
2.	<i>EQ (Scheduled Waste) Regulation 2005 – Reg 8(1)</i> <i>The discarded lithium batteries have not been disposed as a scheduled waste to a prescribed premise but have been disposed as normal rubbish since 2005.</i>	<ul style="list-style-type: none"> - <i>To source for a scheduled waste contractor licensed to take lithium batteries</i> - <i>To store lithium batteries in containers labeled as scheduled waste code SW 103, etc as per Reg10</i> - <i>To start inventory of lithium waste batteries</i> 	<i>February 15, 2009</i>	
3.	<i>EQ (Scheduled Waste)</i>	- <i>To immediately cap</i>	<i>February 20,</i>	

No.	Regulation or COA citation Non-compliance	Proposed CAR	Proposed Completion Date	DOE Remark
	<p><i>Regulation 2005 – Reg 9(3)</i></p> <p><i>Two drums of waste methanol at the store had open bungholes and are left uncapped until it is time to transfer the waste methanol out of the plant. No secondary containment is provided</i></p>	<p><i>the bungholes</i></p> <ul style="list-style-type: none"> - <i>To train workers to cap the bungholes at all times except when necessary to fill the drum with waste methanol</i> - <i>Construct a proper waste shed with roofing, sidewalls and secondary containment sufficient to contain 50% of the total volume of drums stored.</i> 	<p>2009</p>	
<i>etc</i>	<i>Etc</i>	<i>etc</i>	<i>Etc</i>	

(for DOE use only – proposed corrective action acceptance)

CAR form received on: _____ (Date)

Proposed corrective action acceptable: Yes / No (additional remarks in column)

Receiving Officer: _____

Signature: _____

(for DOE use only – completed corrective action verification)

CAR form received on: _____ (Date)

Completed corrective action acceptable: Yes / No (additional remarks in column)

Receiving Officer: _____

Signature: _____