4.3.1 ENVIRONMENTAL ASPECTS

ISO 14001 DEFINITION OF ENVIRONMENTAL ASPECTS AND IMPACTS

Environmental Aspect

In the language of ISO 14001, an environmental aspect is any feature of an organization's activities, products, or services that can 'interact' with the environment or, in other words, that may have an impact on the environment. An activity is anything the organization does in the course of its business; products are the result of manufacturing processes used by an organization; services are activities conducted in support of manufacturing activities. An environmental impact may be adverse or beneficial.

A significant environmental aspect is one that has a significant environmental impact, or has the potential to cause significant impact. Significance is a relative term, and is determined by assessing the relative risks of various activities, products, or services. Examples of environmental aspects and potential environmental impacts associated with them are listed in the accompanying table.

Environmental impacts include effects on air, water (e.g., surface and groundwater), land, vegetation, wildlife, local communities, traditional cultural practices, aesthetic values, recreational uses, and interactions between any of these. Impacts may be seasonal, local, regional, or global (e.g., effects of acid rain, ozone-depleting substances, downstream impacts in the Mekong River).

ISO 14001 4.3.1 ENVIRONMENTAL ASPECTS says:

The organization shall establish and maintain (a) procedures to identify the environmental aspects of activities, products or services that it can control and over which it can be expected to have an influence, to determine those which have, or can have, significant impacts on the environment. The organization shall ensure that environmental aspects related to these significant impacts are considered when setting environmental objectives.

The organization shall keep this information up to date.

IDENTIFICATION OF ENVIRONMENTAL ASPECTS AND IMPACTS

When identifying and assessing the significance of environmental aspects, all components of a company's operations must be considered, not just the obvious manufacturing activities. For example, most facilities will have offices, a canteen, and vehicle parking, all of which may give rise to environmental impacts from the disposal or discharge of wastes. Transportation of raw materials to the site, and shipment of products and wastes from the site must also be taken into account when identifying environmental aspects and impacts. Chemical and fuel storage; laboratory activities; purchasing and warehouse storage; maintenance (e.g., welding, vehicle repair, construction, painting, etc.); research and engineering design;

security and janitor services; emergency response (e.g., fire, spill, gas leak, natural disaster); other upset conditions, for example during process start-up and shut-down; and various contractor and supplier activities all have environmental aspects with actual or potential environmental impacts.

Various techniques can be used to compile a comprehensive listing of environmental aspects and impacts at a facility. Usually it is best to involve people from as many areas of the operation as possible in the initial brainstorming of ideas. Even individuals who may be 'hidden away' in a corner of the operation can contribute useful suggestions, which may be overlooked by people who are considered experts. A matrix of aspects and impacts should be constructed covering the facility's complete range of activities, products, and services.

WHY ENVIRONMENTAL ASPECTS MUST BE IDENTIFIED

Identification of environmental aspects is one of the first tasks that must be undertaken when planning an EMS, because determining how to control the most significant aspects will be a primary focus in the early phases of the work. ISO 14001 requires the organization to develop environmental objectives and targets to address significant aspects, so compiling a systematic and comprehensive matrix of aspects, and a means of assigning priorities are essential first steps towards achieving this goal. Operational controls, such as equipment, maintenance, work procedures, and pollution abatement technology and techniques must also be focussed on the highest risk (i.e., most significant) aspects. And targeted training of personnel to improve the knowledge and skills necessary for effective process control and decision making in key areas is dependent on accurate definition of significant environmental aspects.

INTERPRETATION OF ISO 14001 SPECIFICATIONS

This element of ISO 14001 introduces several terms that are used repeatedly throughout the Standard. Specifically:

- Establish – in ISO language this means to develop, implement, set up
- Maintain – means keep up to date, relevant, and accurate
- Procedure – is a sequence of actions needed to accomplish a task effectively and consistently. Some ISO 14001 procedures must be documented
- Documented – means in writing, either on paper or in electronic form.

In addition, it is clearly stated that the environmental aspects an organization must be especially concerned about are those over which it has influence and control. This refers to operations that company management can affect in one way or another. For example, management has control over:

- The design of products and processes
- Selection of equipment and where it is installed
- Sources of raw materials
- Emissions to the environment

ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACTS
Cutting timber in forestry operations	Loss of wildlife habitat and biodiversity
	Loss of CO_2 absorbing capacity
	Increased erosion and siltation
	Damage to fish-bearing streams
	Loss of community or heritage sites
	Aesthetic, visual effects
Wastewater discharge from a paper mill	Effects of suspended solids, BOD, and toxic chemicals on water quality and water use
Emissions to air from a vehicle	Lowering of air quality due to CO, PAH, particulate emissions
Spill of oil from a storage tank or pipeline	Soil contamination
	Possible surface and groundwater contamination
	Harm to wildlife

- Selection of contractors and suppliers
- Practices for reducing wastes that are discharged or disposed of.

Management may not be able to directly control, but can influence:

- Use of more environmentally friendly materials and supplies
- Amount of packaging used for finished product, and for incoming supplies
- Requirement for vendors to take back empty containers for re-use or recycle.

ASSESSMENT OF RISK OR SIGNIFICANCE

Many detailed techniques are available for conducting risk assessments to determine the relative significance of environmental aspects. Generally, the simple approach is best.

A basic definition of risk is:

Risk = Probability x Consequence

In other words:

Significance = Frequency x Magnitude

Consequence (Magnitude/ Severity) of Occurrence

A scale of consequence from 1 to 5 (i.e., 1 being low level of effects, 5 meaning severe consequences) can be used to assess the magnitude or severity of environmental and health impacts from each environmental aspect. Individual judgement based on knowledge or instinct can be used to assign 'scores' in small group sessions involving personnel from various departments. In addition, legal, business, and financial consequences can also be assessed using the same scale (i.e., 1 being low legal fallout and financial costs, 5 indicating potentially catastrophic legal consequences and business costs to the organization). A fourth scale in the assessment can take into account effects on the organization's public image and reputation. Adding the four scores gives a total for the environmental impact consequences from each environmental aspect identified.

Probability (Frequency/Likelihood) of Occurrence

Similarly, the probability of occurrence of environmental impacts from each environmental aspect can be calibrated using a 1 to 5 scale (i.e., 1 signifying very low probability – a rare occurrence; 5 indicating highly probable – everyday occurrence). Combined with this assessment, the process should also factor in any mitigating or compensating circumstances, such as emission controls or containment facilities. This scale also could also be from 1 to 5, but in contrast to the other scales, 1 represents a high level of control, 5 represents no or very low control. Scored for these two factors are summed to give a value for probability of occurrence of an impact.

Designation of Significant Environmental Aspects

Multiplying the consequence and probability scores for each environmental aspect will give a relative risk ranking number. ISO 14001 does not specify the level of risk at which an organization must take preventive action or set objectives and targets for improvement. The decision is left to the facility management. Each organization must establish its own criteria for significance based on a systematic review of its environmental aspects and their actual and potential impacts.

SUMMARY OF KEY POINTS

- An organization should have a systematic procedure for identifying the environmental aspects and impacts of all its activities, products, and services, and keeping this inventory up to date.
- Environmental aspects must cover normal and abnormal operating conditions, such as process start-up and shut-down; emergency situations; all components of the facility operations, including support services, maintenance, and the storage, transfer, and transport of materials; and residual effects from earlier operations.
- Environmental impacts can include effects on air, water, land, people, wildlife, cultural values, and aesthetics.
- Significant environmental aspects are those that cause significant environmental impacts.
- Significant environmental aspects must be determined in a systematic and logical process by the organization.
- A simple formula for significance based on risk to the environment is:

  Risk = Probability x Consequence

- Environmental aspects must be assessed for any changes to processes, products, installations, raw materials, or wastes.
- Although not specified in the Standard, the information on all environmental aspects and impacts and their significance should be documented, preferably in the form of a matrix.