CHAPTER 4

DEVELOPMENT OF A PRELIMINARY EMS THAT COMPLIES TO ISO 14001 FOR MHSB

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4.1 INTRODUCTION

The results that were obtained from the environmental audit and management review were reported in Chapter 3 and discussions as well as recommendations for improvement were also presented.

As MHSB has indicated its intention to achieve for ISO 14001 certification, an extended study for this objective was carried out. To further the company's commitment to obtain certification to ISO 14001, an extension study to ISO 14001 standards was performed. Results showed that MHSB has the potential to initiate and fully implement the ISO 14001 program.

Based on the recommendations and further discussion with the MHSB's directors, a preliminary Environmental Management System which is in conformance to the ISO 14001 principles was prepared in this chapter.

There are five main principles in the EMS as shown in Table 4.1. The topics of this preliminary EMS are based on the five principles of EMS.

Table 4.1 Five Principles of the EMS (ISO,1995).

Principle	Component
1	Commitment & Policy
2	Planning
3	Implementation
4	Measurement & Evaluation
5	Review and Improvement

4.2 COMMITMENT & POLICY (PRINCIPLE 1)

4.2.1 ENVIRONMENTAL POLICY

An environmental policy was established after several brainstorming and discussions with the top management of MHSB. The environmental policy that was agreed upon is as follows:

"Mesra Hijau Sdn. Bhd. strives towards the protection of the environment in all its activities by stringently practicing sustainable development and ensuring practical nature conservation."

MHSB is involved in projects which will enhance and improve the environment . By developing the above environmental policy, MHSB intends :

- To be aware that its activities might cause environmental consequences to the environment. Therefore environmental considerations are taken into account in all business decisions.
- To keep in mind ways to protect the environment in all aspects of their activities
- To carry out activities which can improve the environment to achieve sustainable development status
- To ensure practical nature conservation by maintaining a balanced ecosystem in the environment by adapting to specific local or regional conditions
- To strive for continual improvement in minimizing environmental consequences in carrying out their activities
- To prevent pollution, reduce waste and consumption of resources (materials, fuel and energy), and commit to recovery and recycling, as opposed to disposal where feasible.
- To comply with relevant environmental regulations, laws and other criteria to which MHSB subscribes.
- To educate and promote environmental awareness among its employees

4.2.2 TOP MANAGEMENT COMMITMENT AND LEADERSHIP

A review of MHSB's top management's commitment and leadership in the environmental field was conducted and the top management agreed that an Environmental Unit be set up whereby the unit is headed by one of its qualified

Environmental Consultant. This unit is to manage environmental issues including upholding the environmental policy and implement environmental management programs. This unit will consist of several qualified environmental and scientific officers who would also monitor the environmental aspects of MHSB's development activities.

Among other functions of this unit are:

- To collect baseline data (water and soil) before the construction of the wetland cells
- To monitor the water and soil quality at the wetland site
- To document all reports concerning the environment
- To identify the legislative and regulatory requirements
- To ensure that all related legislative and regulatory requirements are complied
- To liase with related Government Departments regarding the environmental issues and to keep abreast of any new regulations concerning the environment
- To constantly evaluate the performance of the company compared with relevant internal criteria, external standards, regulations, codes of practice and sets of principles and guidelines
- To identify the environmental aspects of its activities so as to determine those that have or can have significant environmental impacts and liabilities.
- To conduct training to instigate employee environmental awareness
- To set up and report to an Environmental Committee to process suggestions by employees to improve the environment

4.3 PLANNING (PRINCIPLE 2)

4.3.1 IDENTIFICATION OF ENVIRONMENTAL ASPECTS AND EVALUATION OF ASSOCIATED ENVIRONMENTAL IMPACTS

Constant review of the environmental aspects of current activities through revised environmental audit programs would be able to identify the environmental impacts of MHSB's activities. An environmental effects evaluation and register can be carried out and the collective environmental impacts can be evaluated. A detail environmental effects evaluation and register are shown in Table 4.2.

The main issues that have to be looked into in identifying the environmental impacts include air and noise emissions, water pollution, vibration consequences, categories of waste (solid, liquid or hazardous waste), aesthetic and biological impacts.

Table 4.2 Environmental effects evaluation & register

Environmental effects/exposure	Mesra Hijau
Emissions to atmosphere	Carbon monoxide from vehicles, machinery and air compressor.
Liquid water	Washwater, sullage water
Solid waste	Plant trash, paper waste, plastic
Natural resources	Peat, soil, sand, water, plants and fishes
Noise	Potting machine, tractors, transporter, air compressor
Odour	Fertilizer
Dust	Movement of vehicles
Vibration	Insignificant - air compressor
Visual Impact	Positive - nursery, landscaping
Habitats & Ecosystem	Introducing local species of flora and fauna, conservation of endangered species (orchids)
Contaminated Land	Oil and grease spillage (minimal)

4.3.2 LEGAL AND OTHER REQUIREMENTS

Government regulations

An update of the latest government regulations is necessary to serve as a constant reminder of the standard limits and laws made by the Government in relation to MHSB's activities or environmental consequences of its activities.

Environmental Legislation and Standards

(a) Environmental Quality Act

The Environmental Quality Act (EQA), 1974 (Act 127) was set up as the governing environmental legislation in Malaysia to evolve, administer, enforce and monitor regulatory enactment and environmental guidelines as well as to prevent and mitigate environmental consequences.

The environmental regulations which are issued under the EQA, 1974 which is in relation to the MHSB's activities are shown below.

- Environmental Quality Act, 1974; Environmental Quality (Licensing) Regulations, 1977
- Environmental Quality Act, 1974; Environmental Quality (Clean Air) Regulations 1978

- Environmental Quality Act, 1974; Environmental Quality (Sewage and Industrial Effluent) Regulations 1978
- Motor Vehicle (Construction and Use) Rules, 1959
- Road Traffic Ordinance 1958; Motor Vehicles (Control of Smoke and Gas Emissions) Rules 1977
- Road Traffic Ordinance 1958; Road Traffic (Compounding of Offences) (Amendment) Rules 1979
- Environmental Quality Act, 1974; Environmental Quality (Control of Lead Concentration in Motor Gasoline) Regulations 1985
- Environmental Quality (Motor Vehicle Noise) Regulations 1987
- Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987

(b) Water Quality Standards and Criteria

Water Quality Index

The DOE "Opinion -Poll" Water Quality Index (WQI) which is used to classify the status of water course in Malaysia is used to classify the status of the existing water course at the constructed wetlands and related river water course which will act as the receiving effluent discharge points.

WQI values provides a statistical approach for analyzing water quality based on the rank order (subindices) of observations compared to a set of "control value", which is usually a set of water quality standards or recommended limits.

The WQI value obtained shall enable classification of water quality as shown in the Table 4.3 below.

Table 4.3 WQI Classification

WQI Value	Classification of Water Quality
0-59	Polluted waters
60-79	Slightly polluted waters
80-100	Clean waters

Proposed Interim National Water Quality Standards (INWQS)

An interim national water quality standards has evolved and are extensively used to monitor the status of water course. The pollutant limits are aimed at deterring a pronounced effect on human health for drinking and recreation purposes. Considerations are also given for livestock drinking, irrigation and fishes. For this purpose, MHSB uses Class IIB which is river water suitable for recreation purposes to ascertain the river water quality. The specific standards recommended for various beneficial uses, under the ClassIIB of the INWQS are shown in the Table 4.4 below:

Table 4.4 Class IIB parameters and its limits

Parameter	Unit	Class IIB Limits
Physical:		
pH		6.5 -9.0
Turbidity	FTU	50.0
TSS	mg/L	50.0
Chemical:		
Amoniacal Nitrogen	mg/L	0.3
DO	mg/L	4.5-6.4
COD	mg/L	25.0
Biological:		
Faecal coliform	counts/100ml	400.0
BOD	mg/L	25.0

(c) Air Quality Standards & Criteria

The existing air quality on the site should be compared with the Recommended Guidelines for Gaseous Pollutant (at 25°C and 101.13kPa) as shown in Table 4.5 below:

Table 4.5 Recommended Malaysian Guidelines for Gaseous Pollutant

Pollutant and Method	Averaging Time	Malaysian Guidelines (ppm)	Malaysian Guidelines ($\mu g/m^3$)
Ozone AS 2524	1 hour 8 hour	0.10 0.06	200 120
Carbon Monoxide AS 2629	1 hour 8 hour	30 9	35 mg/m^3 10 mg/m^3
Nitrogen Dioxide AS 2447	1 hour	0.17	320
Sulphur Dioxide AS 2523	10 minutes 1 hour 24 hour	0.19 0.13 0.04	500 350 105
Particulates AS 2724.3	24 hour annual	- -	260 90
PM_{10} AS 2724.6	24 hour 1 year	- -	150 50
Lead AS 2800	3 month	-	1.5

The recommended Malaysian annual and daily guidelines for Total Suspended Particulate (TSP) are 90 $\mu g/m^3$ and 260 $\mu g/m^3$ (mean of 24-hour measurement) respectively . The recommended Malaysian guidelines for Dust fallout is 133 mg/m2/day (annual mean of monthly values) and Lead is 1.5 $\mu g/m^3$ (three months averaging period).

(d) Noise Legislation and Standards

Noise levels generated by the Project would come under the "Factories and Machinery (Noise Exposure) Regulations, 1989" , the WHO recommended noise levels by DOE at residential areas and the Occupational Safety and Health Administration (OSHA).

WHO recommended noise levels

DOE states that the noise levels must not exceed 55dB(A) during the daytime and 45 dB(A) at night. The other noise limits under the WHO are as shown in Table 4.6:

Table 4.6 WHO Recommended Noise Exposure Limits

Recommended Noise Exposure Limits, L_{eq} (dB(A))	Remarks
Less than 75 (8 hours exposure per day)	No identifiable risk of hearing damage. Higher levels at prolonged exposure cause hearing impairment and loss
Less than 45 (background noise)	For good speech intelligibility indoors
55 or less	Desirable daytime outdoor noise levels which will not likely cause annoyance in community.
45 or less	Desirable night-time outdoor noise levels
34 or less (bedroom noise limit)	No likelihood of sleep disturbance

Factories and Machinery (Noise Exposure) Regulations, 1989

These regulations are aimed at controlling noise in the workplace. There are three types of noise definition limits under these regulations as shown in Table 4.7 below.

Table 4.7 Factories and Machinery (Noise Exposure) Regulations, 1989

Noise Term	Definition
Daily Noise Dose, D	The cumulative noise exposure of an employee during a working day which is derived from the sum of the duration of exposure at various noise levels against the respective duration limits as given in the First Schedule of the Regulations
Equivalent Continuous Sound Level	The sound level that would produce a given daily noise dose if an employee were exposed to the sound level continuously over an 8-hour workday.
Action Level	An equivalent continuous sound level of 85 dB(A) or daily noise dose equal to 0.5.

Under this regulation, noise levels should not exceed:

- an equivalent continuous sound level of 90dB(A)
- the specified limits in the First Schedule
- the daily dose of unity
- 115dB(A) at any time
- a peak sound pressure level of 140dB(A) for impulsive noise

Occupational Safety and Health Act (OSHA) 1994

The OSHA standards for noise exposure adopted by the Department of Occupational Safety and Health , Malaysia (DOSH) are as shown in Table 4.8:

Table 4.8 OSHA (Noise Exposure) Standards

Maximum Allowable Duration Per Day (hr)	Noise Level (dB(A)), Slow Response
8	90
6	92
4	95
3	97
2	97
2	100
1.5	102
1	105
0.5	110
0.75 or less	115 (maximum)

(e) Other Regulations and Guidelines

Erosion and Siltation

The statutory compliance for erosion and sedimentation control in Malaysia comes under several sections of the laws and enactment. For MHSB's activities, the following acts and enactment will be used as guidelines :

- Land and Conservation Act, 1960 - which prevents siltation and erosion to rivers, canals and drains
- National Land Code, 1965 - which reserves flood plains especially catchment areas for public use
- Drainage Works Ordinate - which controls construction of unauthorized canals and water course drainage diversities
- Local Government Act, 1976 - which controls the deposition of materials in and upon banks of rivers
- Various Mining Enactment - which controls the unauthorized disposal of earth, sludge, dirt and tailings into any waterway.

Guidelines For the Prevention and Control of Soil Erosion and Siltation in Malaysia, 1997.

The guidelines provide a checklist of existing information pertaining to soil erosion and siltation to enable any future activities of MHSB be well planned and executed in a manner with minimum land degradation.

4.3.3 CUSTOMER ENVIRONMENTAL DEMANDS

MHSB as a planting contractor have to abide with its customer's environmental policy, EMS and EIA regulations (if any).Therefore all silt traps and sedimentation ponds as well as mitigation measures suggested in the client's EIA report (Putrajaya, 1997) have to be included in its project development.

4.3.4 INTERNAL PERFORMANCE CRITERIA

A study of MHSB's internal performance criteria showed that MHSB has certain criteria in these areas:

- employees responsibilities - All employees are held responsible for their own actions and are given certain responsibilities to perform. These responsibilities are in line with the employees capabilities and knowledge.
- suppliers - Suppliers to MHSB have to be of a certain standard and the goods purchased are to be of good quality, in good condition and as far as possible, environmental friendly.

- contractors - sub-contractors of MHSB are to abide by all the company's policy, rules and regulations pertaining to a specific development.
- environmental measurement and improvement - MHSB is always trying its best to evaluate its environmental factors and are in the frame of mind to improve on existing conditions to enhance the environment.
- prevention of pollution and resource conservation - Resources especially those which are non-renewable are conserved as much as possible and all activities of MHSB are to keep in mind prevention of pollution.
- hazardous material management - At the moment the hazardous material used by MHSB are purchased on a need-to basis and are not stored (if possible). If any storage required, the hazardous material is kept under tight security.
- waste management - All wastes generated at the site are reclassified into biodegradable, non-biodegradable, recyclable and reusable material. MHSB uphold the 3 R concept of Reduction of waste, Recycling of waste and Reusing of waste material.
- raw material management - Materials used for MHSB's activities are bought on a just-in-time basis. Material management is carried out by the operations manager who keeps a record of what goes in and what goes out of the store.
- energy management - Energy is conserved in MHSB. The generator (which is shared between three companies at the Putrajaya site) operates only from 8 a.m. to 7 p.m. and is discontinued during lunch hour.

4.3.5 OBJECTIVES , TARGETS AND INDICATORS

The following objectives and their respective targets and indicators were drawn up after several discussions with the top management:

- Objective: To reduce the usage of chemical pesticides by replacing them with biopesticides

Target : MHSB intends to organize an Integrated Pest Management with the use of biopesticides within the project site.

Indicators: Growth of plants

- Objective: To carry out conservation of endangered species such as orchids

Target: Propagating endangered species by conducting topcutting.

Indicator: The number of endangered species as ZII plants

- Objective: To encourage and implement solid waste management

Target: A fine of RM5.00 is imposed on any employee if caught littering or smoking. The contractors are fined five ringgit times the no. of workers if any of their workers are caught. The money will be used to buy littering containers to be placed onsite.

To segregate waste before landfilling

Indicator: Cleanliness of the site.

- Objective: Long Term waste reduction

Target : To reduce the usage of raw material by reusing and recycling them.

Indicator: Cost savings in raw material.

- Objective: To promote energy conservation

Target : Do not waste electricity and water resources.

Indicator: Reduction in diesel consumption of the generator used at site and reduction in electricity and water usage at the site. Most of the water used are to be recycled back to the river intake. So no lost of water is recorded.

- Objective: sustainable wetland development,

Target : Balanced flora and fauna development,

Indicator: Biodiversity of the fauna and flora

- Objective : usage of biodegradable materials

Target: Peatpots are used to replace the usage of clay or plastic pots.

Indicator: Reduction in the number of plastic or clay pots

4.3.6 ENVIRONMENTAL MANAGEMENT PROGRAM

The environmental management program are activities which can help to achieve the environmental objectives and targets of the company.

Based on the above environmental objectives and targets, a proposed environmental management program is formulated and is shown in Table 4.9.

Table 4.9 Environmental Management Program

Activity	Responsibility	Target Date
Water Quality and Soil Monitoring Program	Water and Soil Specialist	With immediate effect
Introduce biopesticides	Ecologist	May 1998
Propagating endangered species	Botanist and Ecologist	With immediate effect
Recycling, Reuse and Waste segregation	Nursery Manager	With immediate effect
Energy Conservation	Nursery Manager	With immediate effect
Introducing balanced flora and fauna	Ecologist	With immediate effect
Use environmentally friendly products	Nursery Manager	December 1998

4.4 IMPLEMENTATION (PRINCIPLE 3)

4.4.1 INTRODUCTION

Results from the management review showed that MHSB is upgrading its capabilities and support in the process of continual improvement. To achieve its environmental objectives MHSB would have to focus and align its staff, systems, resources and structure.

Suggestions were made to the management of MHSB to implement its environmental management in stages and these suggestions are based on the results concluded from the management review on the level of awareness of the environmental requirements, aspects, expectations and benefits, and the availability of resources.

4.4.2 ENSURING CAPABILITY

a) Resources - Human, Physical and Financial

A review of the human resources at MHSB showed that the company is understaffed and would require a larger workforce to accomplish its EMS objectives. Nevertheless, MHSB has the financial resources and the skilled technology-know -how people who act as external advisors.

It was suggested that MHSB would have to take the following co-operative strategies in order to manage the resource base to overcome the limitations on implementation:

- larger client organizations to share technology and know-how;
- other SMEs on a supply chain or local basis to define and address common issues, to share know-how, to facilitate technical development, to use facilities jointly, to establish a way to study the EMS, to collectively engage consultants
- standardization organizations, SME associations for training and awareness programs
- universities and other research centres to support production and innovation. University research often comes with a durable tax deduction under the Income Tax Act 1967 (Section 34B).

b) EMS Alignment and Integration

The management review showed that MHSB have several existing management policies. To effectively manage environmental concerns, MHSB will have to effectively aligned and integrate the EMS elements with the existing management elements.

Several areas in the existing management system that will benefit from this integration include:

I. Organization policies

The organization policy should reflect the environmental awareness of MHSB. Each year, there would be a theme which will integrate both environmental policies and other management policies of MHSB. This theme which will reflect its original organizational policy would be reviewed annually by the top management and made known to all.

II. Resource Allocation

The annual budget and personnel review would have to take into account the personnel and the financial resources needed to implement the EMS elements. Resources for an environmental unit set up by the top management of MHSB would be allocated a reasonable resource allocation annually to perform its function.

III. Operational Controls and Documentation

The EMS can be integrated into all operational controls and documentation by considering environment factor into MHSB's operational systems.

IV. Information and Support Systems

Information and Support Systems could very well go hand-in-hand with the EMS by providing the monitoring information regarding the quality of the environment.

V. Training and Development

Each new employee of MHSB is to be given training (similar to the "buddy" system) in its job function. Environmental awareness will be a part of this training. New ideas regarding ways to enhance company's environmental policy would always be included in the research, environment and development unit.

VI. Rewards and Appraisal

An appraisal form is to be implemented whereby the employee and his/her immediate superior are required to fill up the performance ratings of the employee. In this appraisal form, environmental awareness and activities are questioned and extra points are noted. Each employee's contribution to uphold the EMS is taken into consideration along with other important features of the job. A periodic date would be fixed to discuss the ratings between the employee and the immediate superior. An agreement has to be reached between the employee and the immediate superior and the final ratings are sent to the Top Management for salary adjustment and promotion. The points carried on the

appraisal form would determine the range of increment and promotion. A copy of the proposed appraisal form is appended in Appendix 3.

Rewards can also be given to employees for environmental awareness through the suggestion scheme. In this scheme, employees are encouraged to submit suggestions to improve the environmental impacts of MHSB's activities. All suggestions are received and processed by a Environmental Review Committee. Rewards will be given for each suggestion implemented. A copy of this suggestion scheme is appended in Appendix 4.

VII.Measuring And Monitoring Systems

Monitoring systems should include factors on the environment such as air quality, water quality and noise quality .

VIII.Communication And Reporting

Communication between the employee level and the top management should be available to relay their concerns. Weekly department meetings between the employees and the HOD and then between the HOD and the top management would be carried out to resolve issues including environmental issues. Brainstorming among the management team should be carried out to improve environmental conditions at the site.

c) Accountability and Responsibility

Employees at all levels should be accountable, within the scope of their responsibilities, for environmental performance in support of the overall environmental management system.

To ensure effective development and implementation of an EMS, it is necessary to assign appropriate responsibilities and authorities.

The proposed sample for MHSB is as shown in Table 4.10 below.

Table4.10 Environmental Responsibilities

Environmental Responsibilities	Typical Person (s) Responsible
Establish overall direction	Board of Directors
Develop environmental policy	Board of Directors; Environmental Manager
Develop environmental objectives, targets and programs	Project Manager and Environmental Manager
Monitor overall EMS performance	Environmental Manager and Environmental officers (Committee)
Assure regulatory compliance (external)	Operations Manager
Ensure EMS compliance (internal)	All managers, environmental manager

con't Table 4.10

Environmental Responsibilities	Typical Person (s) Responsible
Ensure continual improvement	All Managers
Identify customers' expectations	Marketing & Project Manager
Identify suppliers' expectations	Purchaser
Develop and maintain accounting procedures	Finance / Accounting Managers
Comply with defined procedures	All Staff

d) Environmental Awareness and Motivation

The top management of MHSB would have a key role to play in building awareness and motivating employees by explaining the organization's environmental values and communicating its commitment to the environmental policy.

In this context, MHSB intend to do so through executive conferences with all the middle management staff in which the top management would establish, reinforce and communicate the organizational commitment to the environmental policy. Internal meetings within each department in MHSB would then relay the message to the lower management staff about the importance of upholding MHSB's environmental policy.

e) Knowledge, Skills and Training

The knowledge and skills needed to achieve the environmental objectives are to be considered in personnel selection, recruitment, training, skills development and on-going education.

Appropriate training relevant to the achievement of environmental policies, objectives and targets should be provided to all personnel within the organization. Employees would then have the appropriate knowledge base, which include training in methods and skills required to perform their tasks in an efficient and competent fashion and knowledge of the impact their activities can have on the environment if performed incorrectly.

MHSB would also ensure that contractors working at the site provide evidence that they have the requisite knowledge and skills to perform the work in an environmentally responsible manner.

The level and detail of training varies according to the task, education and training needed to ensure the employees' knowledge of regulatory requirements, internal standards and the organization's policies and objectives is current.

The training programs must include the following elements:

- identification of employee training needs
- develop a training plan to address defined needs;
- verification of conformance of training program to regulatory or organizational requirements;
- training of target employee groups;
- documentation of training received;
- evaluation of training received through appraisal form system.

Table 4.11 shows the types of environmental training can be provided.

Table 4.11 Types of training

Type of Training	Audience	Purpose
Introduction to Environmental Management Systems	All employees	To introduce and promote benefits of implementing EMS
Raising awareness of strategic importance of environmental management	Top Management	To gain commitment and alignment to the organization's environmental policy

con't Table 4.11

Type of Training	Audience	Purpose
Raising general environmental awareness	All employees	To gain commitment to the environmental policy, objectives and targets and to instill a sense of individual responsibility
Skills Enhancement	Employees with environmental responsibilities	Improve performance in specific areas - operations, R & D
Compliance	Employees whose actions can affect compliance	Ensure regulatory and internal requirements for training are met.

4.4.3 SUPPORT ACTION

a) Communication and Reporting

Communication includes establishing processes to report internally and, where desired , externally on the environmental activities of MHSB in order to :

- demonstrate management committee to the environment;
- deal with concerns and questions about the environmental issues of MHSB's activities, products and services;

- raise awareness of the organization's environmental policies, objectives, targets and programs; and
- inform internal and external interested parties about MHSB's environmental management system and performance as appropriate.

Figure 4.1 shows the flowchart of a way to incorporate environmental considerations in the decision making process. A new activity goes through a series of decision making of the Environmental Review Committee. The type of raw material needed for this new activity is taken into consideration while making considerations about this new activity. Cross-checking with MHSB's environmental policy, the activity is evaluated based on its potential environmental impacts. These include air, noise, water and solid waste problem.

If a certain activity causes problems to the environment, the mitigation measures are proposed; after which the financial, human and physical resources needed to accomplish this new activity is considered. Monitoring parameters are set to indicate the level of the environmental impact. The new activity is put through the environmental audit review. If it satisfies the environmental policy and does not conflict with other environmental objectives of MHSB, the project is implemented.

If no mitigation measure can be proposed, the activity is rejected. If no potential environmental impacts are envisaged, the project goes through the implementation stages of launching this new activity

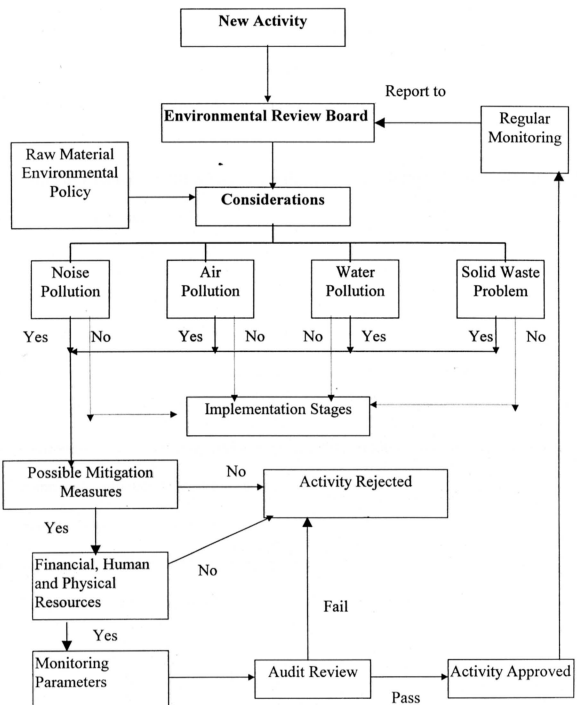

Figure 4.1 Flowchart on decision making

Results from the EMS monitoring, audit and management review are communicated to those within MHSB and its joint-venture partners who are responsible for performance. This is to motivate employees and encourage public understanding and acceptance of the organization's efforts to improve the environmental performance.

To fulfill this requirement, MHSB has taken the initiative to include the following items in all its formal reports:

- MHSB company profile
- environmental policy, objectives and targets
- environmental management processes (including interested party involvement and employee recognition)
- environmental performance evaluation (including releases, resource conservation, compliance, product stewardship and risk)
- opportunities for improvement
- supplementary information, such as glossaries, and,
- independent verification of the contents.

CHAPTER 5 CONCLUSION & RECOMMENDATIONS

Our study of MHSB activities showed that MHSB has the potential to initiate and fully implement the ISO 14001 program. During the study, it has been conveyed and promoted the importance of the EMS to the Board of Directors. It should be noted that the studies are primarily for the basis of encouraging and preparing MHSB for its commitment to the environment. The top management of MHSB is agreeable in principle to the framework of the prepared EMS.

The initial audit exercise showed that there are several weaknesses in the management of the site such as the management of the solid and hazardous waste disposal. The biodegradable solid waste poses a problem as most of the waste at site is made out of agricultural residues. Nevertheless, the management of MHSB has looked into the possibility of utilizing some of these agricultural residues to make compost. Other non-biodegradable waste such as plastic trays and polybags are encouraged to be reused as often as possible and to be segregated from the solid waste with the intention of recycling. Washings from the site and soiled vehicles should be channeled to proper drainage system before reentering into the nearby wetland cell. Hazardous materials such as chemicals used onsite have taken into account safety measures of which can be upgraded. Location and management of the diesel drums should take into consideration the safety and health of the workers.

Water and Soil Monitoring Programs are carried out by MHSB periodically. Nevertheless, a proper and regular environmental auditing should also be carried out.

With regards to the operational process of the site, several positive actions are noted through the audit. These include, proper plant identification procedures, ensuring abundance of species and proper plant handling as well as propagation of endangered species of plants. Being environmentally conscious, MHSB has taken proper steps in ensuring that a plant-monitoring program is carried out to achieve a natural biodiversity of fauna and flora in the constructed wetlands.

The management of MHSB is environmentally conscious but lack training and employee awareness program. Potential funding for these training can be sourced from the Human Resource Development Fund, a training incentive provided by the Ministry of Human Resource, Malaysia.

Proper documentation was also identified as non-compliance to the EMS requirement. Despite the fact that MHSB have documented some of its operational activities, this documentation has to be further improved to a more systematic documentation in line with the EMS requirements.

Nevertheless, there are positive steps taken by the management of MHSB, which proves their commitment in conserving and upgrading the environment. These steps include usage of biodegradable peatpots and soil erosion management practices.

Recommendations for the management include:

- Further implement the documentation of a detail EMS, and
- Allocate financial resources for implementation of the EMS.

A preliminary EMS has been drafted in this report. Nevertheless, details of each component of the EMS have to be refined and be supplemented with procedural reports for each operational system that is to be implemented.

Funds for implementation of the EMS and subsequently application for ISO 14001 have to be properly allocated. This includes funds to expand the Environmental Department at MHSB and hire external environmental consultants to periodically audit, monitor and continuously reanalyze the EMS at MHSB.

For both internal and external environmental communication and reporting, the following should be of importance:

- two-way communication should be encouraged
- information should be understandable and adequately explained
- information should be verifiable
- MHSB should present an accurate picture of its performance; and
- information should be presented in a consistent form (e,g, similar units of measurement to allow for comparison between one period and another).

MHSB can communicate environmental information in the following ways:

- externally, through annual reports, regulatory submissions, public government records, industry association publications, the media and paid advertising;
- organization of open days, the publication of telephone numbers where complaints and questions can be directed , company website page; and
- internally, through bulletin board postings, internal newspapers, meetings and electronic mail messages.

Operational processes and procedures should be defined and appropriately documented and updated as necessary. The documents should establish and specify effective operational procedures and control.

b) EMS Documentation

The existence of EMS documentation will support employee awareness of what is required to achieve MHSB's environmental objectives and enable the evaluation of the system and environmental performance.

The EMS documentation would have the following summary for ease of use:

- collate the environmental policy, objectives and targets
- describe the means of achieving environmental objectives and targets
- document the key roles, responsibilities and procedures;
- provide direction to related documentation and describe other elements of MHSB's management system, where appropriate; and
- demonstrate that the environmental management system elements appropriate for the organization are implemented.

Each employee must be able to demonstrate his understanding of the latest EMS documentation and also the specific operational procedures documentation relevant to his job function within a certain period.

All documentation should be dated (with dates of revision), readily identifiable, organized, and retained for a specified period. All documents should be :

- Able to be identified with the appropriate organization, division, function, activity, and /or contact person;
- documents are periodically reviewed, revised as necessary and approved by authorized personnel prior to issue;
- the current versions of relevant documents are available at all locations where operations essential to the effective functioning of the system are performed
- obsolete documents are promptly removed from all points of issue and points of use; and
- documents can be in any medium and should be useful and easily understood.

4.4.4 OPERATIONAL CONTROL

Operations and activities contributing to significant environmental impacts of an organization should be considered when developing or modifying operational controls and procedures. The activities can be divided into three categories:

1. Activities to prevent pollution and conserve resources in new capital projects, process changes and resource management and property (acquisitions), diversities and property management)
2. Daily management activities to assure conformance to internal and external organizational requirements, and to ensure their efficiency and effectiveness; and
3. Strategic management activities to anticipate and respond to changing environmental requirements

Areas of which should have operational control and procedures include:

- plant identification
- plant sourcing and collection
- plant preparation and propagation
- plant maintenance
- planting procedures
- pest control management
- raw material handling
- purchasing
- R & D design and engineering
- contractors
- laboratories
- storage of goods, raw materials and plants
- transportation
- usage and storage of hazardous materials
- marketing and advertising
- acquisition or construction of property and facilities

4.4.5 EMERGENCY PREPAREDNESS AND RESPONSE

An emergency plan for MHSB is attached in Appendix 4 which can ensure that there will be appropriate response to unexpected or accidental incidents.

The emergency plans deals with

- accidental emissions to atmosphere
- accidental discharges to water and land,
- specific environment and ecosystem effects from accidental releases

The procedures should take into account incidents arising, or likely to arise as consequences of

- abnormal operating procedures
- accidents and potential emergency situations

The emergency plans includes:

- emergency organization and responsibilities
- a list of key personnel
- details of emergency services
- an internal and external communication plan
- actions taken in the event of different types of emergencies
- information on hazardous materials, including each material's potential impact on the environment, and measures to be taken in the event of accidental release; and

- training plans and testing for effectiveness.

4.5 MEASUREMENT AND EVALUATION (PRINCIPLE 4)

4.5.1 INTRODUCTION

There should be a system in place for measuring and monitoring actual performance against MHSB's environmental objectives and targets in the areas of management systems and operational processes. This includes evaluation of compliance with relevant environmental legislation and regulations. The results should be analyzed and used to determine areas of success and to identify activities requiring corrective action and improvement.

4.5.2 MEASURING AND MONITORING (ON-GOING PERFORMANCE)

a) Environmental Audit

An environmental audit should be carried out periodically to ensure that environmental performance is regularly monitored. An example of the audit is appended in Appendix 1 .This audit will also periodically evaluate compliance with relevant legal and other compliance.

b) Corrective and Preventive Action

The findings, conclusions and recommendations reached as a result of monitoring, audits and other reviews of the EMS should be documented, and the necessary corrective and preventive actions recommended for implementation with a systematic plan to follow-up and that for ensuring their effectiveness.

c) EMS Records and Information Management

All records that are evidence of the on-going operation of the EMS should be properly kept and filed such as :

- legislative and regulatory requirements
- permits
- environmental aspects and their associated impacts
- environmental training activity
- inspection, calibration and maintenance activity
- monitoring data
- details of non-conformance: incidents, complaints and follow-up action
- product identification : composition and property data
- supplier and contractor information
- environmental audits and reviews

The effective management of these records is essential to the successful implementation of the EMS. The key features of good environmental information management include :

- means of identification
- collection
- indexing
- filing
- storage
- maintenance
- retrieval
- retention
- disposition of pertinent EMS documentation and records

Among the environmental information that MHSB has to manage effectively are :

- Water quality results
- Soil quality results
- ecological balance
- raw material handling
- hazardous chemicals management

4.5.3 AUDITS OF THE ENVIRONMENTAL MANAGEMENT SYSTEM

Audits of the EMS should be conducted on a periodic basis to determine whether the system conforms to planned arrangements and has been properly implemented and maintained.

Audits of the EMS can be carried out by MHSB's personnel, and / or by external parties selected by MHSB. In any case, the person (s) conducting the audit should be in a position to do so objectively and impartially and should be properly trained.

The frequency of audits should be guided by the nature of the operation in terms of the seriousness of environmental consequences and potential impacts. The results of previous audits should also be considered in determining frequency.

The EMS audit report should be submitted in accordance with the audit plan.

4.6 REVIEW AND IMPROVEMENT (PRINCIPLE 5)

4.6.1 INTRODUCTION

A continual improvement process should be applied to an EMS to achieve overall improvement in environmental performance

4.6.2 REVIEW OF THE EMS

MHSB's management should, at appropriate intervals, conduct a review of the EMS to ensure its current suitability and effectiveness.

The review of the EMS should be broad enough in scope to address the environmental dimensions of all activities, products or services of the organization, including their impact on financial performance and possibly competitive position.

Review of the EMS should include:

- Review of environmental objectives, targets and environmental performance
- findings of the EMS audit
- an evaluation of its effectiveness, and
- an evaluation of the suitability of the environmental policy and the need for changes in the light of

⇒ changing legislation

⇒ changing expectations and requirements of interested parties

⇒ changes in products or activities of the organization

⇒ advances in science and technology

⇒ lessons learned from environmental incidents

⇒ market preferences

⇒ reporting and communication

A sample of the environmental management audit review is appended in Appendix 6.

4.6.3 CONTINUAL IMPROVEMENT

The concept of continual improvement is embodied in the EMS. It is achieved by continually evaluating the environmental performance of the EMS against its environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The continual improvement process should:

⇒ identify areas of opportunity for improvement of the environmental management system which leads to improved environmental performance

⇒ determine the root cause or causes of nonconformance or deficiencies

⇒ develop and implement a plan of corrective and preventive action to address root causes

⇒ verify the effectiveness of the corrective and preventive actions

⇒ document any changes in procedures resulting from process improvement

⇒ make comparisons with objectives and targets