

CHAPTER 9

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

9.0 Introduction

This chapter presents the Environmental Management Plan (EMP) which has been formulated for the proposed development of Satellite Waste Management Centre Johor project to assist in the environmental management of the potential issues identified in **Chapter 7** to ensure proper implementation of the proposed mitigation measures. Also part in this chapter present the Emergency Response Plan (ERP), which provides procedures and actions to be taken in the event of an emergency outbreak at the project site.

9.1 Environmental Management Plan

An Environmental Management Plan (EMP) is recommended to be outlined in order to manage all the potential issues identified in the report. EMP is a practical tool for the implementation of mitigation and protective measures identified in the EIA. The plan relates anticipated project activities to sensitive environmental factors, outlining policies and procedures for the protection of the environment. The outcome will minimize the risk of costly, time-consuming environmental issues, while maximizing productivity, bottom-line performance and goodwill.

The main elements of the EMP are:

- i) Mainstreaming tools and Guided Self-Regulation (GSR) element;
- ii) Legislative and contractual requirements and conditions that need to be observed and complied with;
- iii) An administrative setup (i.e. safety, health and environment unit) to be responsible for environmental management with well defined organization structure, manpower requirements, and responsibilities of personnel;
- iv) Environmental monitoring requirements and compliance requirements;
- v) Monitoring programmes during construction phase (i.e. ambient air, surface water, noise and silt trap discharge quality);
- vi) Monitoring programmed during operation phase (i.e. stack emission, ambient air, surface water, effluent and noise quality);
- vii) Environmental records and reporting requirements;
- viii) Key environmental management action plan for the protection of environmental component identified; and

- ix) Actions required and the reporting sequence for emergency responses during accidents or abnormal operations of the plant.

9.1.1 Objective of the EMP

The environmental management objectives for the proposed is to provide a set of procedures to protect and sustain the environmental qualities during the construction and operational phase in compliance with the relevant environmental quality standards and regulations stipulated by the DOE.

The environmental management shall be prepared to cover all aspects relevant to the construction and operation phases; environmental monitoring as well as auditing and implementation of responses to identified problems. Environmental monitoring aspects will basically include ambient air, effluent discharge, noise level and stack emission during both construction and operation phases.

Thus, an Environmental Officer (EO) shall be positioned in the organization to oversee the implementation of the mitigation measures and to liaise with relevant agencies pertaining to matters related to the safety, health and environment.

The EMP shall serve as a reference document for environmental management by the Project Proponent, Contractors and Environmental Consultants undertaking the development of the project (i.e. during construction and operation). EMP is the key outcome of the EIA process which:

- Identifies potential impact areas of the project;
- Monitoring and auditing programme for the potential impacts framework; and
- Establishes reporting and mitigating (including emergency) response procedures.

9.1.2 Submission and Format of the EMP

During the post submission stage of EIA report, an EMP which translates the pollution prevention and mitigation measures (P2M2s) recommended in the EIA report and the approval conditions (COAs) into an action by the Project Proponent (i.e. CJSB), Main Contractor and Environmental Consultant (i.e. AMR) and shall be submitted to DOE Johor State for further evaluation.

The format of the EMP is as follows:

- **Chapter 1: Introduction**

Provide information on:

- a. Project layout as approved in the Development Order by Local Authority;
- b. Project implementation schedule; and
- c. Name of the EMP preparer and his consulting firm.

- **Chapter 2: Policy**

Provide information on:

- a. Company's corporate policy statement on environmental management and protection; and
- b. Commitment by the top management on the mainstreaming of environmental agenda and installing of self-regulation in the development project and on ensuring continuous compliance with the environmental regulatory requirement.

- **Chapter 3: Organizational Structure**

Provide information on:

- a. Organization chart of the company's top management with responsibilities on environmental management and protection (names, positions, mobile phone contact numbers and e-mail addresses);
- b. Name, mobile phone contact number and e-mail address of environmental manager, Environmental Officer (EO), engineering consultant, contractor, site supervisor and competent person; and
- c. Name of environmental consultant and accredited laboratory conducting environmental monitoring, analysis of environmental samples and submitting reports to the DOE.

- **Chapter 4: Training Requirement**

Provide information on:

- a. Plan for staff training in order to develop competency to discharge responsibilities on the environmental requirements and compliance. The training areas shall include maintenance and performing monitoring of all Pollution Prevention and Mitigating Measures (P2M2) wherever relevant.

- **Chapter 5: Environmental Requirements**

Provide information on:

- a. EIA Conditions of Approval (COAs);
- b. Land Disturbing Pollution Prevention and Mitigation Measures (LD-P2M2);
- c. Pollution Prevention and Mitigation Measures (P2M2) to be implemented;
- d. Water pollution control;
- e. Control of air pollution and noise;
- f. Material and waste management;
- g. Scheduled waste management;
- h. Emergency response plan;
- i. Abandonment and closure plan;
- j. Mainstreaming tools and Guided Self-Regulation (GSR) element; and
- k. Declaration and checklist.

9.1.3 List of Requirement for Environmental Compliance

The project proponent for this project shall ensure the project comply with all applicable laws, regulations, guidelines and approval conditions issued by authorities for this project. The related laws and regulations to be complied are as follows but not limited to:-

- i. Environmental Quality Act 1974 (Act 127);
- ii. Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order, 2015;
- iii. Environmental Quality (Scheduled Wastes) Regulations, 2005;
- iv. Environmental Quality (Clean Air) Regulations, 2014;
- v. Environmental Quality (Industrial Effluent) Regulations, 2009;
- vi. Environmental Quality (Licensing) Regulations, 1977;
- vii. Local Government Act, 1976; and
- viii. Factory and Machinery Act, 1967.

The relevant environmental under the development of this project are discussed in the following sections. These requirements will form the basis for the implementations of the environmental monitoring programme. In the event that local regulations and/or guidelines are not available for certain environmental requirement, regulations and/or guidelines used in order development countries will be used as reference.

9.1.3.1 Air and Stack Emission Quality

The relevant legislations and guidelines with respect to the management of air quality for plant activities are as follows:-

- Malaysian Ambient Air Quality Standards (MAAQS), 2013;
- Environmental Quality (Clean Air) Regulations, 2014;
- Environmental Quality Act, 1974 (Section 22) – Restrictions on pollution of the atmosphere;

(22) Restrictions on pollution of the atmosphere

- (1) No person shall, unless licensed, emit or discharge any environmentally hazardous substances, pollutants or wastes into the atmosphere in contravention of the acceptable conditions specified under section 21.
- (2) Without limiting the generality of subsection (1), a person shall be deemed to emit or discharge wastes into the atmosphere if –
 - a) He places any matter in a place where it may be released into the atmosphere;
 - b) He causes or permits the discharge of odours which by virtue of their nature, concentration, volume or extent are obnoxious or offensive;
 - c) He burns any wastes of the trade, process or industry; or
 - d) He uses any fuel burning equipment not equipped with any device or

(3) Any person who contravenes subsection (1) shall be guilty of an offence and shall be liable to a fine not exceeding one hundred thousand ringgit or to imprisonment for a period not exceeding five years or to both and to further fine not exceeding one thousand ringgit a day for every day that the offence is continued after a notice by the Director General requiring him to cease the act specified therein has been served upon him.

- Volume 1: Guideline for the Installation and Maintenance of Continuous Emission Monitoring Systems (CEMS) for Industrial Premises or Facilities; and
- Volume II: Guideline for the Continuous Emission Monitoring Systems-Data Interface System (CEMSB-DIS) for Industrial Premises or Facilities

9.1.3.2 Water Quality

The relevant legislations and guidelines with respect to the management of water quality for plant activities are as follows:-

- Environmental Quality (Industrial Effluent) Regulations, 2009;
- Environmental Quality (Sewage) Regulation, 2009;
- Environmental Quality Act, 1974 (Section 25) – Restrictions on pollution of inland waters; and

(25) Restriction on pollution of inland waters

- (1) No person shall, unless licensed, emit, discharge or deposit any environmentally hazardous substances, pollutants or wastes into any inland waters in contravention of the acceptable conditions specified under section 21.
- (2) Without limiting the generality of subsection (1), a person shall be deemed to emit, discharge or deposit wastes into inland waters if –
- a) He places any wastes in or on any waters or in place where it may gain access to any waters;
 - b) He places any waste in a position where it falls, descends, drains, evaporates, is washed, is blown or percolates or is likely to fall, descend, drain, evaporate or be washed, be blown or percolated into any waters, or knowingly or through his negligence, whether directly or indirectly, causes or permits any wastes to be placed in such a position; or
 - c) He causes the temperature of the receiving waters to be raised or lowered by more than the prescribed limits.

- (3) Any person who contravenes subsection (1) shall be guilty of an offence and shall be liable to a fine not exceeding one hundred thousand ringgit or to imprisonment for a period not exceeding five years or to both and to a further fine not exceeding one thousand ringgit a day for every day that the offence is continued after a notice by the Director General requiring him to cease the act specified therein has been served upon him.

- Environmental Quality Act, 1974 (Section 29) – Prohibitions of discharge of waste into Malaysians waters; and

(29) Prohibition of discharge of wastes into Malaysian waters

- (1) No person shall, unless licensed, discharge environmentally hazardous substances, pollutants or wastes into the Malaysian waters in contravention of the acceptable conditions specified under section 21.
- (2) Any person who contravenes subsection (1) shall be guilty of an offence and shall be liable to a fine not exceeding five hundred thousand ringgit or to imprisonment not exceeding five years or to both.

- National Water Quality Standards (NWQS) for Malaysia.

9.1.3.3 Noise Quality

The relevant legislations and guidelines with respect to the management of noise levels for plant activities are as follows:-

- The Planning Guidelines for Environmental Noise Limits and Control; and
- Environmental Quality Act, 1974 (Section 23) – Restrictions on noise pollution.

(23) Restriction on noise pollution

- (1) No person shall, unless licensed, emit or cause or permit to be emitted any noise greater in volume, intensity or quality in contravention of the acceptable conditions specified under section 21.
- (2) Any person who contravenes subsection (1) shall be guilty of an offence and shall be liable to a fine not exceeding one hundred thousand ringgit or to imprisonment for a period not exceeding five years or to both and to a further fine not exceeding five hundred ringgit a day for every day that the offence is continued after a notice by the Director General requiring him to cease the act specified therein has been served upon him.

9.1.3.4 Solid Waste Management

Solid waste is the unwanted solid materials generated from industrial commercial activities and domestic. This unwanted need to have a systematic management collection, storage, treatment and disposal. General waste is controlled under the *Local Government Act 1976* and *Refuse Collection, Removal and Disposal By-Laws* under the Act. These acts enable State Authorities to prohibit disposition of waste in streams, watercourse and public drain. The by-laws specify that commercial and industrial waste may be collected and disposed of on a fee basis prescribed by local authorities. Ignoring the by-laws is an offence.

9.1.3.5 Scheduled Waste Management

The relevant legislations and guidelines with respect to the management of scheduled wastes for the scheduled wastes plant activities are as follows:-

- Environmental Quality Act, 1974 [Section 18(1)] – Prescribed Premises to be licensed;

(18) Prescribed premises to be licensed

- (1) The Minister after consultation with the Council may by order prescribe the premises (hereinafter referred to as prescribed premises) the occupation or use of which by any person shall, unless he is holder of a licensed issued in respect of those premises, be an offence under this Act.
(1A) The Minister, after consultation with the Council, may by order prescribe the vehicle or ship used for the movement, transfer, placement or deposit of wastes (hereinafter referred to as prescribed conveyance) the use of which by any person shall, unless he is the holder of a licensed issued in respect of the prescribed conveyance, be an offence under this Act.
- (2) The provisions of subsection (1) do not apply to a person –
 - a) Who, on the date of the coming into operation of this Act, is the occupier of prescribed premises, and within the prescribed period after that date makes application for a license in respect of those prescribed premises;
 - b) Who, where by virtue of any order made by the Minister from time to time amending any previous order made under this section, premises not previously prescribed premises become prescribed premises, is, consequent upon the order, the occupier of any prescribed premises, and who within the prescribed period after the publication of the order in the Gazette makes application for a license in respect of those prescribed premises;
 - c) Who has made application for the transfer to him of a licence in respect of any prescribed premises and made the application within the prescribed period after he became the occupier of those prescribed premises, until his application has been finally determined.

- (3) Any person found guilty of an offence under subsection (1) or (1A) shall be liable to a fine not exceeding fifty thousand ringgit or imprisonment for a period not exceeding two years or to both and to a further fine of one thousand ringgit for every day that the offence is continued after a notice by the Director General requiring him to cease the act specified has been served upon him.

- Environmental Quality (Prescribed Premises) (Scheduled Wastes Treatment and Disposal Facilities) Order and Regulations, 1989;
- Environmental Quality (Scheduled Wastes) Regulations, 2005;
- Environmental Quality Act, 1974 (Section 34B) – Prohibition against placing, deposit, etc. of scheduled wastes;

(34B) Prohibition against placing, deposit, etc. of scheduled wastes

- (1) No person shall –
- a) Place, deposit or dispose of, or cause or permit to place, deposit or dispose of, except at prescribed premises only, any scheduled wastes on land or into Malaysian waters;
 - b) Receive or send, or cause or permit to be received or sent any scheduled wastes in or out of Malaysia; or
 - c) Transit or cause or permit the transit of scheduled wastes, without any prior written approval of the Director General.
- (2) The Director General may grant the written approval either subject to conditions or unconditionally.
- (3) For the purpose of this Act, any act of receiving or sending, or transit of any scheduled wastes with an approval obtained through falsification, misinterpretation or fraud or which does not conform in a material way with the relevant documents in such form as may be prescribed, shall be an offence.

- Environmental Quality (Scheduled Waste) Regulations, 2005 (Regulation 4) – Disposal of scheduled wastes;

4. Disposal of scheduled wastes

- (1) Scheduled wastes shall be disposed of at prescribed premises only.
- (2) Scheduled wastes shall, as far as is practicable, be rendered innocuous prior to disposal.

- Environmental Quality (Scheduled Waste) Regulations, 2005 (Regulation 5) – Treatment of scheduled wastes;

5. Treatment of scheduled wastes

- (1) Scheduled wastes shall be treated at prescribed premises or at on-site treatment facilities only.
- (2) Residuals from treatment of scheduled wastes shall be treated or disposed of at prescribed premises.

- Environmental Quality (Scheduled Wastes) Regulations, 2005 (Regulation 6) – Recovery of material or product from scheduled wastes;

6. Recovery of material or product from scheduled wastes

- (1) Recovery of material or product from scheduled wastes shall be done at prescribed premises or at on-site recovery facilities.
- (2) Residuals from recovery of material or products from scheduled wastes shall be treated or disposed of at prescribed premises.

- Environmental Quality (Scheduled Wastes) Regulations, 2005 (Regulation 9) – Storage of scheduled wastes;

9. Storage of scheduled wastes

- (1) Scheduled wastes shall be stored in containers which are compatible with the scheduled wastes to be stored, durable and which are able to prevent spillage or leakage of the scheduled wastes into the environment.
- (2) Incompatible scheduled wastes shall be stored in separate containers, and such containers shall be placed in separate secondary containment areas.
- (3) Containers containing scheduled wastes shall always be closed during storage except when it is necessary to add or remove the scheduled wastes.
- (4) Areas for the storage of the containers shall be designed, constructed and maintained adequately in accordance with the guidelines prescribed by the Director General to prevent spillage or leakage of scheduled wastes into the environment.
- (5) Any person may store scheduled wastes generated by him for 180 days or less after its generation provided that –
 - (a) The quantity of scheduled wastes accumulated on site shall not exceed 20 metric tonnes; and
 - (b) The Director General may at any time, direct the waste generator to send any scheduled wastes for treatment, disposal or recovery of material or product from the scheduled wastes up to such quantity as he deems necessary.
- (6) A waste generator may apply to the Director General in writing to store more than 20 metric tonnes of scheduled wastes.
- (7) If the Director General is satisfied with the application made under sub regulation (6), the Director General may grant a written approval either with or without conditions.

- Environmental Quality (Scheduled Wastes) Regulations, 2005 (Regulation 10) – Labelling of scheduled wastes;

10. Labelling of scheduled wastes

- (1) The date when the scheduled wastes are first generated, name, address and telephone number of the waste generator shall be clearly labelled on the containers that are used to store the scheduled wastes.
- (2) Containers of scheduled wastes shall be clearly labelled in accordance with the types applicable to them as specified in the Third Schedule and marked with the scheduled waste code as specified in the First Schedule for identification and warning purposes.
- (3) No person is allowed to alter the markings and labels mentioned in sub regulations (1) and (2).

- Environmental Quality (Scheduled Wastes) Regulations, 2005 (Regulation 14) – Spill or accidental discharge; and

14. Spill or accidental discharge

- (1) In the event of any spill or accidental discharge of any scheduled wastes, the contractor responsible for the waste shall immediately inform the Director General of the occurrence.
- (2) The contractor shall do everything that is practicable to contain, cleanse or abate the spill or accidental discharge and to recover substances involved in the spill or accidental discharge.
- (3) The waste generator shall provide technical expertise and supporting assistance in any clean-up operation referred to in sub regulation (2).
- (4) The contractor shall undertake studies to determine the impact of the spillage or accidental discharge on the environment over a period of time to be determined by the Director General.

- Environmental Quality (Scheduled Wastes) Regulations, 2005 (Regulation 15) – Conduct of training.

15. Conduct of training

Every waste generator shall ensure that all his employees involved in the identification, handling, labelling, transportation, storage and spillage or discharge response of scheduled wastes attend training programmes.

9.1.3.6 Environmental Auditing and Review

The general guideline for the EMP assigned the requirement for an environmental auditing focusing on the implementation of the EMP and other environmental management elements in the implementations of the project. The environmental audit will be conducted on an annual basis and will undertake the following tasks:

- i. Carry out environmental compliance audits;
- ii. Verify implementations of corrective and preventive actions;
- iii. Interpret audit findings; and
- iv. Prepare a comprehensive environmental auditing report.

From the environmental auditing report, a management review should be conducted on an annual basis. This practice is required to inspect the effectiveness and performance of the mitigation measures and also to review the EMP and the monitoring and auditing programs if deemed necessary.

9.1.3.7 Reporting

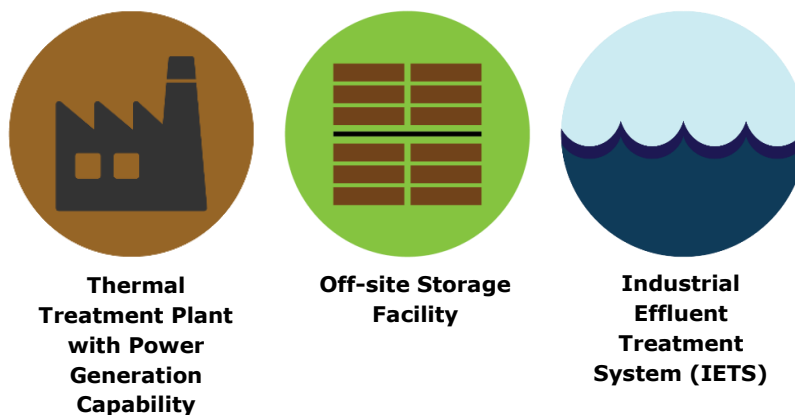
The following documents shall be made available to all parties involved in the Project implementation for the records of environmental performance at the Project site throughout the operational phase of the project.

- i. Environmental Management Plan (EMP) Report;
- ii. Environmental Monitoring Programme;
- iii. Annual Environmental Monitoring Programme; and
- iv. Environmental Audit Report.

9.2 Proposed Monitoring Programme

Monitoring programme is an essential component in the overall EMP. It comprises of three (3) types of monitoring i.e. performance monitoring (PM), compliance monitoring (CM) and impact monitoring (IM). The monitoring programme will be periodically reviewed and revised by accredited laboratory when necessary to take into consideration the changes made during project development.

Cenviro (Johor) Sdn. Bhd. (CJSB) will have the following main scheduled waste facilities to be built at the proposed Satellite Waste Management Centre Johor (SWMCJ). The proposed monitoring programme shall consider these facilities prior to the construction and operation phase.



9.2.1 Performance Monitoring

Performance monitoring (PM) is a proactive and preventive monitoring of processes to ensure Air Pollution Control Systems (APCS) as well as Industrial Effluent Treatment System (IETS) are optimally operated and maintained during the operation phase. PM should be incorporated as a standard code of practice (SOP) which must be implemented and strictly enforced. The performance monitoring shall be conducted SWMCJ project in accordance to the technical guidance published by the Department of Environment (DOE) as follow;

1. **Technical Guidance on Performance Monitoring of Air Pollution Control Systems (APCS); and**
2. **Technical Guidance on Performance Monitoring of Industrial Effluent Treatment Systems (IETS).**

Performance monitoring typically forms an integral part of preventive maintenance procedure adopted in an industry to ensure smooth and uninterrupted operation of pollution control and treatment system. Additionally, preventive maintenance helps detect early onset of deteriorating performance of the control system hence avoids unnecessary plant shutdowns and costly enforcement penalties. Preventive maintenance procedure can specify action levels at which corrective actions are to be initiated.

9.2.1.1 Performance Monitoring of Air Pollution Control System (APCS)

Preventive maintenance and performance monitoring of an APCS is to abate the release of air contaminants into the atmosphere, prerequisite for an uninterrupted and efficient operation of the control system. If performance monitoring had been put in place and strictly adhered to, the unacceptable state of air pollution control system would never happen. Continual and efficient functioning of air pollution control systems is dependent on effective preventive maintenance and performance monitoring program.

The objectives of the performance monitoring are as follows;

- i. To standardize the performance monitoring procedure to be conducted by the industries to ensure proper working conditions of air pollution control equipment.
- ii. To standardize the performance monitoring requirements as spelt out in the approval conditions of new installations of air pollution control system.

Performance monitoring of air pollution control equipment is an acceptable surrogate to stack emission testing to gage compliance with emission standards. Stack emission testing is not commonly conducted on a routine basis due to cost and other constraints. Data kept in preventive maintenance procedures and performance monitoring is typically used by environmental agencies worldwide as an additional enforcement tool apart from actual stack emission testing.

All air pollution control equipment must be maintained and operated in such a manner that they are in good working condition. In order to ensure compliance with this requirement a set of activities need to be conducted on a routine basis typically by the operator of the pollution control equipment. These activities commonly referred to as operation and maintenance or more appropriately preventive maintenance and performance monitoring are routine duties of the operator.

Performance monitoring programme shall be practiced. Logbook containing performance monitoring data information shall be provided in accordance to the document entitled **"Technical Guidance on Performance Monitoring of Air Pollution Control System (APCS)"** published by the Department of Environment. The proposed performance monitoring for the thermal treatment plant at SWMCJ including bag filter and wet scrubber shall be prepared and getting approval from Department of Environment Johor.

A successful treatment is dependent upon all components of the treatment system being operational in optimal condition. Problems with any one of the system components will affect the overall efficiency and resulting in poor effluent or emission quality. To ensure successful treatment and regulatory compliance, each of the treatment processes (i.e. unit processes and unit operations) needs close monitoring on a regular basis. Typical forms/log sheets to be used to record the performance data may be prescribed or recommended. At a minimum the

required parameters must be monitored and data kept in log sheets as shown in **Table 9.1** to **9.2** for bag filter and **Table 9.3** to **9.4** for wet scrubber. The log sheets shall be made available to the DOE officers for checking and inspection.

Table 9.1: Typical Forms for Performance Monitoring Data/Activities of Bag Filter: (A) Daily

(A) Daily; Month:

Date	Time	Pressure, Pa		Flow rate, m ³ /hr	Notes on Opacity/ Stack Conditions	Notes on Discharge Hopper Condition	Operator's Signature	Supervisor's Signature
		In	Out					
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Table 9.2: Typical Forms for Performance Monitoring Data/Activities of Bag Filter: (B) Weekly
 (B) Weekly; Month:

Date	Procedure	Notes	Operator's Signature	Supervisor's Signature
Week 1	<ul style="list-style-type: none"> ✓ Inspect screw-conveyor bearings for lubrication ✓ Check packing glands ✓ Operate damper valves ✓ Check compressed-air lines, including line filters and dryers ✓ Check that valves are opening and closing properly in bag- cleaning sequence. ✓ Verify accuracy of temperature-indicating equipment ✓ Check pressure-drop- indicating 			
Week 2	<ul style="list-style-type: none"> ✓ Inspect screw-conveyor bearings for lubrication ✓ Check packing glands ✓ Operate damper valves ✓ Check compressed-air lines, including line filters and dryers ✓ Check that valves are opening and closing properly in bag- cleaning sequence. ✓ Verify accuracy of temperature-indicating equipment ✓ Check pressure-drop- indicating 			
Week 3	<ul style="list-style-type: none"> ✓ Inspect screw-conveyor bearings for lubrication ✓ Check packing glands ✓ Operate damper valves ✓ Check compressed-air lines, including line filters and dryers ✓ Check that valves are opening and closing properly in bag- cleaning sequence. ✓ Verify accuracy of temperature-indicating equipment ✓ Check pressure-drop- indicating 			
Week 4	<ul style="list-style-type: none"> ✓ Inspect screw-conveyor bearings for lubrication ✓ Check packing glands ✓ Operate damper valves ✓ Check compressed-air lines, including line filters and dryers ✓ Check that valves are opening and closing properly in bag- cleaning sequence. ✓ Verify accuracy of temperature-indicating equipment ✓ Check pressure-drop- indicating 			

Table 9.3: Typical Forms for Performance Monitoring Data/Activities of Wet Scrubber: (A) Daily

(A) Daily; Month:

Date	Time	Gas Flow Measurement		Pressure of Scrubber Body, Pa		Temperature of Gas, °C		pH of Liquor	Wet Scrubber Spray Flow Rate, m ³ /hr		Opacity/ Stack Condition	Operator's Signature	Supervisor's Signature
		Fan Motor Current, amp	Flow Rate, m ³ /hr	In	Out	In	Out		In	Out			
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Table 9.3: Typical Forms for Performance Monitoring Data/Activities of Wet Scrubber: (A) Daily

(A) Daily; Month:

Date	Time	Gas Flow Measurement		Pressure of Scrubber Body, Pa		Temperature of Gas, °C		pH of Liquor	Wet Scrubber Spray Flow Rate, m ³ /hr		Opacity/ Stack Condition	Operator's Signature	Supervisor's Signature
		Fan Motor Current, amp	Flow Rate, m ³ /hr	In	Out	In	Out		In	Out			
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21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													

Table 9.4: Typical Forms for Performance Monitoring Data/Activities of Wet Scrubber: (B)
Weekly

(B) Weekly; Month:

Date	Procedure/Check Point		Notes	Operator's Signature	Supervisor's Signature
Week 1	Pump	Leaking Increased noise			
	Valve	Position Leaks			
	Piping	Leaks			
	Body	Leaks			
	Pressure Gage	Pressure change from previous day			
	Pressure Gage Ammeter Combination	Changes in either or both pressure reading and ampere drawn from last clean system check readings			
Week 2	Pump	Leaking Increased noise			
	Valve	Position Leaks			
	Piping	Leaks			
	Body	Leaks			
	Pressure Gage	Pressure change from previous day			
	Pressure Gage Ammeter Combination	Changes in either or both pressure reading and ampere drawn from last clean system check readings			
Week 3	Pump	Leaking Increased noise			
	Valve	Position Leaks			
	Piping	Leaks			
	Body	Leaks			
	Pressure Gage	Pressure change from previous day			
	Pressure Gage Ammeter Combination	Changes in either or both pressure reading and ampere drawn from last clean system check readings			
Week 4	Pump	Leaking Increased noise			
	Valve	Position Leaks			
	Piping	Leaks			
	Body	Leaks			
	Pressure Gage	Pressure change from previous day			
	Pressure Gage Ammeter Combination	Changes in either or both pressure reading and ampere drawn from last clean system check readings			

9.2.1.2 Performance Monitoring of Industrial Effluent Treatment Systems (IETS)

Industrial effluents vary significantly in pollution characteristics hence different unit processes and unit operations are utilized to treat them. This subsection presents the general considerations on performance monitoring requirements so that effective monitoring program can be established for the varied unit processes and operations in an Industrial Effluent Treatment System (IETS).

It is proactive monitoring of certain parameters to provide a diagnostic indication to ensure that unit operations and unit processes are operating optimally. Performance Monitoring (PM) is conducted in order to monitor the performance of unit operations and unit processes which make up the IETS in the premise.

The Environmental Quality Act, 1974 provides the legal basis for environmental management in general and pollution control in particular. The most relevant subsidiary legislation on water pollution control is Environmental Quality (Industrial Effluent) 2009. Performance monitoring is a component of preventive maintenance that forms an integral part self-regulation approach. Performance monitoring of IETS is required by the Department of Environment under the approach of self-monitoring and record keeping by the industry. Monitoring, recording and reporting of the IETS performance are required to demonstrate that the treatment system is functioning correctly and the effluent standards are being complied with.

The performance monitoring for the IETS shall be in accordance to the **“Technical Guidance on Performance Monitoring of Industrial Effluent Treatment Systems (IETS)”** published by the DOE.

Performance monitoring needs to be carried out for IETS installed in Cenviro (Johor) Sdn. Bhd. (CJSB) to ensure continuous compliance. The summary ranges of the parameters which are commonly monitored to indicate the optimal performance of the processes used in the treatment of industrial effluents in described in this sub-section. Monthly sampling and testing are recommended for major wastewater parameters i.e. Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD) as well as Ammoniacal Nitrogen (NH₃-N). Daily attention is required on pH as it plays major roles in providing the optimum condition for coagulation-flocculation processes. Generally, the checking of parameters is essential to indicate the functionality, overall status and the efficiency level of the IETS.

9.3 Compliance Monitoring

Compliance monitoring (CM) will be conducted to ensure the emission and discharge from the proposed project complies with the local regulations and relevant standards. The objectives of the compliance monitoring are shown in **Figure 9.1**.

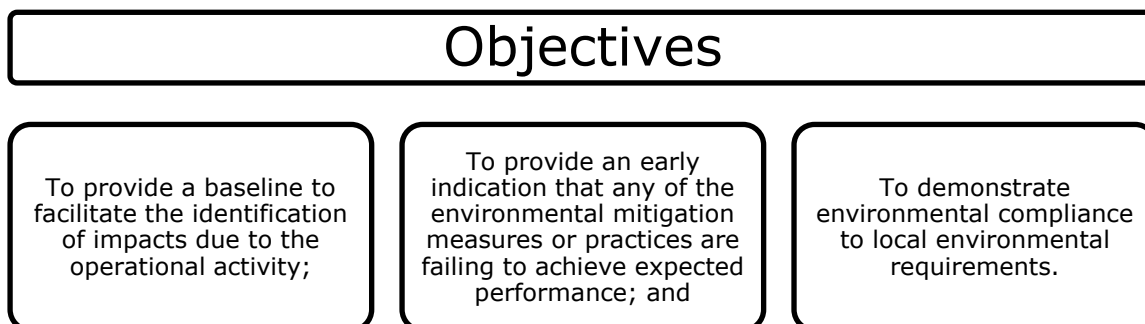


Figure 9.1: Objectives of Compliance Monitoring

The summary of the proposed compliance monitoring during construction and operation phase is shown in **Table 9.5** below.

Table 9.5: Summary of Compliance Monitoring

No.	Monitoring Components	Number of Stations	Monitoring Stations	Sampling Frequency
During Construction Phase				
1.	Ambient Air Quality	3	A1, A2 and A3	Quarterly
2.	Surface Water Quality	2	SW1 and SW2	Quarterly
3.	Noise Quality	3	N1, N2 and N3	Quarterly
4.	Silt Trap Discharge Quality	1	Discharge point of sedimentation pond	Bi-monthly
During Operation Phase				
1.	Stack Emission Quality	1	INC	Quarterly
2.	Ambient Air Quality	3	A1, A2 and A3	Quarterly
3.	Surface Water Quality	2	SW1 and SW2	Quarterly
4.	Effluent Quality	1	Final Discharge Point	Quarterly
5.	Noise Quality	3	N1, N2 and N3	Quarterly

The sampling locations, parameters to be measured, frequencies and duration of the monitoring as well as the assessment criteria and reporting requirements are described in this sub-section. **Table 9.6** and **9.7** shows the proposed compliance monitoring programme for this project during construction and operation phase, respectively but not limited to the proposed method.

Table 9.6: Proposed Compliance Monitoring (CM) Programme During Construction Phase

No.	Environmental Component	Compliance	Frequency/ Year	Monitoring Location	Parameters	Recommended Limit	Methods
1.	CONSTRUCTION PHASE						
1.1	Ambient Air Quality	Malaysian Ambient Air Quality Standards, 2013	Quarterly	A1 A2 A3	Particulate Matter 10 (PM ≤ 10 micron) Particulate Matter 2.5 (PM ≤ 2.5 micron)	150 $\mu\text{g}/\text{m}^3$ @ 24-hr 75 $\mu\text{g}/\text{m}^3$ @ 24-hr	USEPA Method IO-2.2 USEPA Method IO-2.2
1.2	Surface Water Quality	Class III, National Water Quality Standards (NWQS) for Malaysia	Quarterly	SW1 SW2	COD Colour Turbidity Aluminium Ammoniacal Nitrogen Barium DO Flouride Hardness as CaCO_3 Iron Phosphorous Selenium Silver Sodium Aldrin/Dielrin Chlordane t-DDT	50 mg/L - - 0.06 mg/L 0.9 mg/L - 3.0–5.0 mg/L 10 mg/L - 1.0 mg/L 0.1 mg/L 0.04 mg/L - - 0.01 mg/L 0.02 mg/L 1.0 mg/L	APHA 5220 B APHA 2120 B APHA 2130 B APHA 3030 F APHA 4500-NH ₃ B & C APHA 3030 F APHA 4500 O C APHA 4500 F- D APHA 2340 C APHA 3030 F APHA 4500-P B&C APHA 3030 F APHA 3030 F APHA 6630 B APHA 6630 B APHA 6630 B

Table 9.6: Proposed Compliance Monitoring (CM) Programme During Construction Phase (cont.)

No.	Environmental Component	Compliance	Frequency/ Year	Monitoring Location	Parameters	Recommended Limit	Methods
1.2	Surface Water Quality (cont.)	Class III, National Water Quality Standards (NWQS) for Malaysia	Quarterly	SW1 SW2	Endosulfan	-	APHA 6630 B
					Heptachlor and Heptachlor Epoxide	0.06 mg/L	APHA 6630 B
					Lindane	0.4 mg/L	APHA 6630 B
					2,4-D	450 mg/L	APHA 6630 B
					Total Coliform	50,000 counts/100 mL	APHA 9222 B
					Faecal Coliform	5,000 counts/100 mL	APHA 9221 B
1.3	Noise Quality	The Planning Guidelines for Environmental Noise Limits and Control, Second Edition, 2007	Quarterly	N1 N2 N3	LAeq, Lmax, Lmin	70 dBA (day time)	BS 4142:1997
					LAeq, Lmax, Lmin	60 dBA (night time)	BS 4142:1997
1.4	Silt Trap Discharge Quality	As per requirement by the DOE	Bi-monthly	Discharge point of Silt Trap	TSS	50 mg/L	APHA 2540D
					Turbidity	250 Nephelometric Turbidity Unit (NTU)	NA

Table 9.7: Proposed Compliance Monitoring (CM) Programme During Operation Phase

No.	Environmental Component	Compliance	Frequency/ Year	Monitoring Location	Parameters	Recommended Limit	Methods
2.	OPERATION PHASE						
2.1	Stack Emission Quality	Environmental Quality (Clean Air) Regulations, 2014	Quarterly	INC	Total Particulate Matter	100 mg/m ³	USEPA Method 5/ MS 1596:2003
					NMVOC as total organic carbon	10 mg/m ³	USEPA Method 0030
					Hydrochloric Acid	40 mg/m ³	USEPA Method 26A
					Hydrofluoric Acid	1 mg/m ³	USEPA Method 26A
					Sulfur Dioxide	50 mg/m ³	USEPA Method 6C
					Nitrogen Oxides (expressed as NO ₂)	200 mg/m ³	USEPA Method 7E
					Carbon Monoxide	50 mg/m ³	USEPA Method 10
					Cadmium	Total 0.05	USEPA Method 29
					Thallium	mg/m ³	USEPA Method 29
					Mercury	0.05 mg/m ³	USEPA Method 29
					Antimony	Total 0.5 mg/m ³	USEPA Method 29
					Arsenic		USEPA Method 29
					Lead		USEPA Method 29
					Chromium		USEPA Method 29
					Cobalt		USEPA Method 29
					Copper		USEPA Method 29
					Manganese		USEPA Method 29
					Nickel		USEPA Method 29
					Vanadium		USEPA Method 29
			Bi-annually	INC	PCDD/PCDF	0.1ng TEQ/M ³	USEPA Method 23/1613A

Table 9.7: Proposed Compliance Monitoring (CM) Programme During Operation Phase (cont.)

No.	Environmental Component	Compliance	Frequency/ Year	Monitoring Location	Parameters	Recommended Limit	Methods
2.2	Ambient Air Quality	Malaysian Ambient Air Quality Standards, 2013	Quarterly	A1	Particulate Matter 10 (PM \leq 10 micron)	150 $\mu\text{g}/\text{m}^3$ @ 24-hr	USEPA Method IO-2.2
				A2			
				A3	Particulate Matter 2.5 (PM \leq 2.5 micron)	75 $\mu\text{g}/\text{m}^3$ @ 24-hr	USEPA Method IO-2.2
					Sulphur Dioxide	350 $\mu\text{g}/\text{m}^3$ @ 1-hr	ISC 704C
					Nitrogen Dioxide	320 $\mu\text{g}/\text{m}^3$ @ 1-hr	ISC 406
					Carbon Monoxide	35 mg/m^3 @ 1-hr	In house method AMR-AA01 Manufacturer's Measurement Procedures (Dräger)
					Ozone	200 $\mu\text{g}/\text{m}^3$ @ 1-hr	ISC 411
2.3	Surface Water Quality	Class III, National Water Quality Standards (NWQS) for Malaysia	Quarterly	SW1	COD	50 mg/L	APHA 5220 B
				SW2	Colour	-	APHA 2120 B
					Turbidity	-	APHA 2130 B
					Aluminium	0.06 mg/L	APHA 3030 F
					Ammoniacal Nitrogen	0.9 mg/L	APHA 4500-NH ₃ B & C
					Barium	-	APHA 3030 F
					DO	3.0–5.0 mg/L	APHA 4500 O C
					Flouride	10 mg/L	APHA 4500 F- D
					Hardness as CaCO ₃	-	APHA 2340 C
					Iron	1.0 mg/L	APHA 3030 F
					Phosphorous	0.1 mg/L	APHA 4500-P B&C

Table 9.7: Proposed Compliance Monitoring (CM) Programme During Operation Phase (cont.)

No.	Environmental Component	Compliance	Frequency/ Year	Monitoring Location	Parameters	Recommended Limit	Methods
2.3	Surface Water Quality (cont)	Class III, National Water Quality Standards (NWQS) for Malaysia	Quarterly	SW1 SW2	Selenium	0.04 mg/L	APHA 3030 F
					Silver	-	APHA 3030 F
					Sodium	-	APHA 3030 F
					Aldrin/Dielrin	0.01 mg/L	APHA 6630 B
					Chlordane	0.02 mg/L	APHA 6630 B
					t-DDT	1.0 mg/L	APHA 6630 B
					Endosulfan	-	APHA 6630 B
					Heptachlor and Heptachlor Epoxide	0.06 mg/L	APHA 6630 B
					Lindane	0.4 mg/L	APHA 6630 B
					2,4-D	450 mg/L	APHA 6630 B
					Total Coliform	50,000 counts/100 mL	APHA 9222 B
					Faecal Coliform	5,000 counts/100 mL	APHA 9221 B
2.4	Effluent Quality	Standard B, Environmental Quality (Industrial Effluent) Regulations, 2009	Quarterly	Final Discharge Point	Temperature	40°C	APHA 2550 B
					pH value	5.5 – 9.0	APHA 4500 H+ B
					BOD ₅ at 20°C	50 mg/L	APHA 5210B
					Suspended Solid	100 mg/L	APHA 2540D
					Mercury	0.05 mg/L	APHA 3112B
					Cadmium	0.02 mg/L	APHA 3120B
					Chromium Hexavalent	0.05 mg/L	APHA 3500 CR-B
					Arsenic	0.10 mg/L	APHA 3120B

Table 9.7: Proposed Compliance Monitoring (CM) Programme During Operation Phase (cont.)

No.	Environmental Component	Compliance	Frequency/ Year	Monitoring Location	Parameters	Recommended Limit	Methods
2.4	Effluent Quality (cont.)	Standard B, Environmental Quality (Industrial Effluent) Regulations, 2009	Quarterly	Final Discharge Point	Cyanide	0.10 mg/L	APHA 4500CN-C&E
					Lead	0.5 mg/L	APHA 3120B
					Copper	1.0 mg/L	APHA 3120B
					Manganese	1.0 mg/L	APHA 3120B
					Nickel	1.0 mg/L	APHA 3120B
					Tin	1.0 mg/L	APHA 3120B
					Zinc	2.0 mg/L	APHA 3120B
					Boron	4.0 mg/L	APHA 3120B
					Iron	5.0 mg/L	APHA 3120B
					Silver	1.0 mg/L	APHA 3120B
					Aluminium	15 mg/L	APHA 3030 & APHA 3030 F 2005
					Selenium	0.5 mg/L	APHA 3120B
					Barium	2.0 mg/L	APHA 3120B
					Fluoride	5.0 mg/L	APHA 4500 F-D
					Formaldehyde	2.0 mg/L	IN-HOUSE METHOD (QWI-CH/17-33)
					Phenol	1.0 mg/L	APHA 5530B&D
					Free Chlorine	2.0 mg/L	HACH METHOD 8131
2.5	Effluent Quality (cont.)	Standard B, Environmental Quality (Industrial Effluent) Regulations, 2009	Quarterly	Final Discharge Point	Sulphide	0.50 mg/L	APHA 4500S2-D
					Oil and Grease	10 mg/L	APHA 5520B
					Ammoniacal Nitrogen	20 mg/L	APHA 4500-NH3 B & C
					Colour	200 ADMI	NA

Table 9.7: Proposed Compliance Monitoring (CM) Programme During Operation Phase (cont.)

No.	Environmental Component	Compliance	Frequency/ Year	Monitoring Location	Parameters	Recommended Limit	Methods
2.5	Noise Quality	The Planning Guidelines for Environmental Noise Limits and Control, Second Edition, 2007	Quarterly	N1	LAeq, Lmax, Lmin	70 dBA (day time)	BS 4142:1997
				N2			
				N3	LAeq, Lmax, Lmin	60 dBA (night time)	BS 4142:1997

9.4 Impact Monitoring (IM)

Impact monitoring (IM) will be only conducted to monitor the impact from effluent discharge from the proposed project towards the nearby sensitive receptors on a case to case basis when required. This is because the P2M2 is clearly identified and operation procedures are adequate.

9.5 Continuous Emission Monitoring System (CEMS)

Today, Continuous Emission Monitoring Systems (CEMS) are required under some of the EPA regulations for either continual compliance determinations or determination of exceedances of the standards. In Malaysia, it is the requirement from the Department of Environment (DOE). CEMS is an integrated system for a continuous measurement of pollutant concentrations or emissions rates and generally consists of system hardware, data acquisition and system integrator, sample interface, pollutant analyzer, data recorder, the associated electrical wiring and other hardwares. The CEMS includes the following major subsystems:

- Sample Interface – Used to perform one or more of the following tasks: sample acquisition, sample transportation, and sample conditioning or the protection of the monitor from the effects of the stack effluent;
- Pollutant Analyser – Senses the pollutant gas and generates an output proportional to the gas concentration;
- Flow Rate Monitor (where applicable) – Senses the stack (duct) gas velocity, which is used in conjunction with the pollutant concentration to determine the mass emissions rate of the pollutant; and
- Data Acquisition and Handling System – Electronically records all measurements and automatically calculates and records emissions and heat input (where applicable) in the required unit of measure.

Many of the principles of stack testing also apply to continuous monitoring systems. The difference is that the stack test is for a relatively short time period (hours), while the CEMS cover longer periods of time such as months or years.

9.5.1 Purpose of the CEMS

CEMS are used to measure air pollution emissions and other parameters (air volumetric flow, flue gas opacity and moisture content) from a variety of industrial sources. CEMS are typically used to:

- i. Monitor compliance with air pollution emission limits;
- ii. Provide data for emissions inventory applications; and
- iii. Indicate a control system's performance.

9.5.2 Monitoring Locations

CEMS are most commonly located in an exhaust stack or vent. However, CEMS may also be used for fugitive emissions monitoring (i.e. emissions from building openings that do not have stack or exhaust fans).

9.5.3 CEMS System Overview

Referring to **Figure 9.2** below, it is shown that the system overview for CEMS process from the source (plant) and finally to the Department of Environment (DOE). From that, DOE can easily view or monitor the condition of the incinerator online.

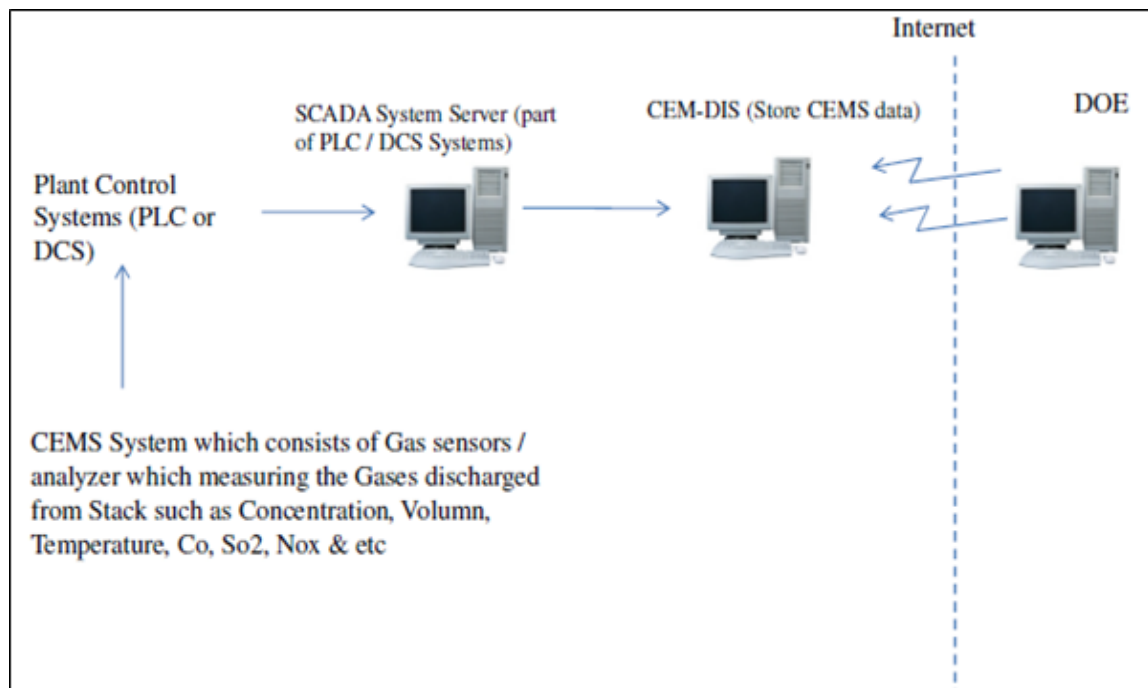


Figure 9.2: CEMS System Overview

9.5.4 CEMS Installation Process

Figure 9.3 is the process to register CEMS system by approval from the DOE. After the installation at the incinerator, applicant needs to report and fill up the 'Registration of Industrial for Continuous Emission Monitoring System (CEMS)' form and submit to the DOE for approval.



Figure 9.3: CEMS Installation Process

9.5.5 Pollutants for Waste Incinerators (All Sizes)

All the activities specified in the regulations can be referred from the '*Guideline for the Installation & Maintenance of Continuous Emission Monitoring Systems (CEMS)*' – Volume 1 by DOE. In this case, the source activities are focusing on waste incinerators that include Total Particulate Matter, NMVOC as Total C, HCl, HF, SO₂, NO₂ and Carbon Monoxide (CO).

The limit value and data frequency can be referred in **Table 9.8** below.

Table 9.8: Parameter and Limit Value for CEMS

No.	Pollutants	Limit Value (mg/m ³)	Data Frequency
1.	Total Particulate Matter	100	½ H Average
2.	NMVOC as Total C	10	½ H Average
3.	Hydrogen Chloride (HCl)	40	½ H Average
4.	Hydrogen Fluoride (HF)	1	½ H Average
5.	Sulphur Dioxide (SO ₂)	50	½ H Average
6.	Nitrogen Dioxide (NO ₂)	200	½ H Average
7.	Carbon Monoxide (CO)	50	½ H Average

Source: *Guideline for the Installation & Maintenance of Continuous Emission Monitoring, Systems (CEMS) – Volume 1* by Department of Environment (DOE), version 6.0, page 5, Nov 2009

9.6 Environmental Auditing

The audit report will be submitted on an annual basis to DOE during the construction and operational phases to evaluate the degree of compliance with the regulatory environmental requirements. It shall be carried out by DOE registered Environmental Auditor.

The audit report should include the following:

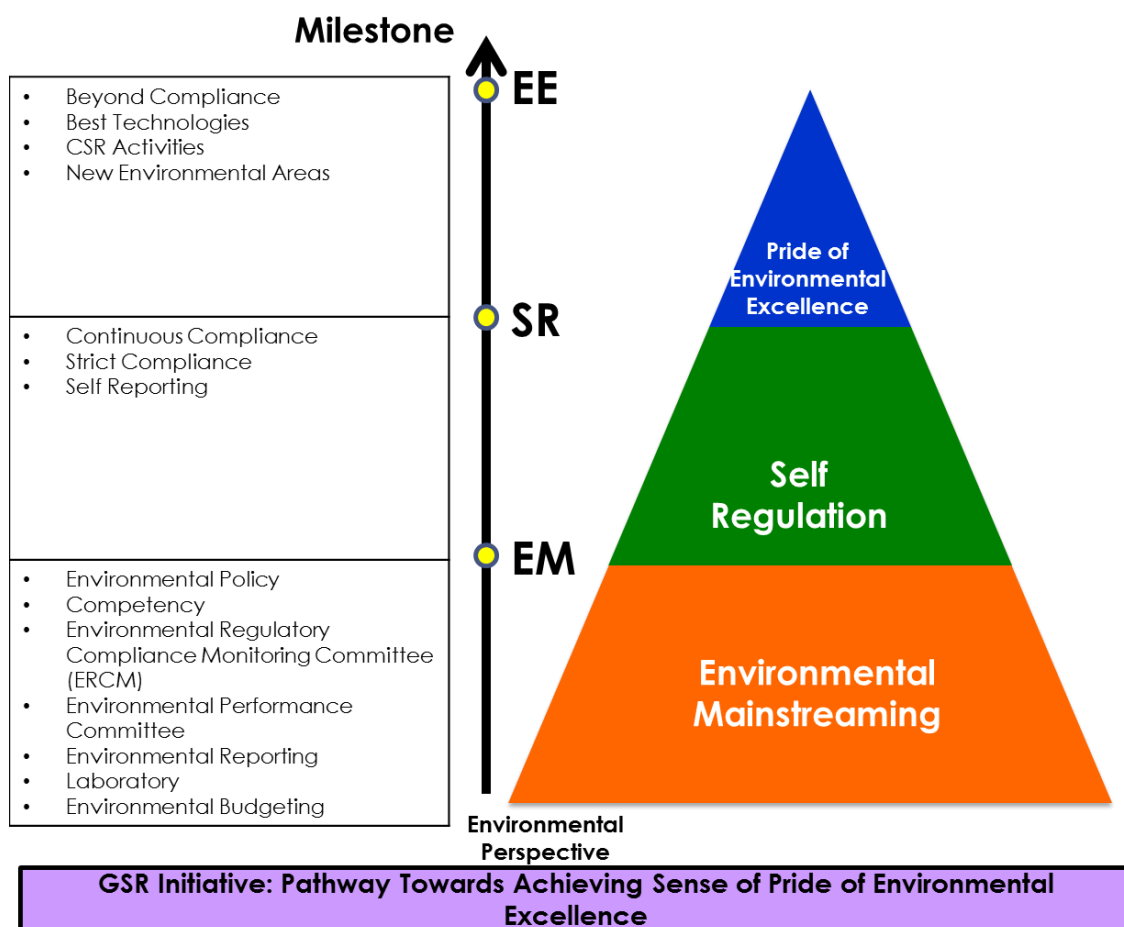
- i. Compliance with all monitoring requirements imposed by DOE;
- ii. Compliance with all the standards, criteria and guidelines as imposed by DOE and other authorities;
- iii. Compliance with all the proposed plans submitted to relevant Government Departments;
- iv. Compliance with mitigation measures; and
- v. Compliance with any other conditions imposed by the government.

The proposed environmental auditing for this proposed project is shown in **Table 9.9**.

Table 9.9: The Proposed Environmental Audit

Regulation	Phase	Frequency	Reference	Certified Person
Section 33A, Environmental Quality Act, 1974 (Act 127)	Construction phase	Yearly	Environmental Audit Guidance Manual, 2011	DOE Registered Auditor
	Operational Phase			

9.7 Mainstreaming of Environmental Agenda and Self-Regulation Culture



Self-regulation has been adopted by the Department of Environment (DOE) as a long-term goal to be achieved and a culture to be inculcated within the regulated sectors through mainstreaming of environmental agenda. Environmental mainstreaming has been integrated into all the recent regulations of the DOE. The implementation of environmental mainstreaming to promote and instill self-regulation in industrial pollution control has been translated into regulatory requirements on performance monitoring of pollution control measures, scheduled reporting, record keeping, competent persons and involvement of environmental professionals playing specific roles. This approach to pollution control is a win-win concept which has shown to accrue positive results in optimal operation of pollution control systems, systematic management of performance monitoring data and improved regulatory compliance on a sustained basis. On a wider perspective, self-regulation which complements the existing command and control approach of the DOE, would result in cultivating environmental ownership and excellence in environmental commitment from the regulated sectors.

9.7.1 General Considerations

Legal responsibility rests on the shoulders of the project proponent who shall be totally committed towards ensuring regulatory compliance of the project with the EIA procedure at all stages of project planning and implementation. The project proponent is the key driver for ensuring the success self-regulation approach in environmental management through the mainstreaming of environmental agenda throughout the project implementation phases. The project proponent shall ensure top-down organizational commitment to environmental regulatory compliance to all personnel, at all levels of the organization, including the registered EIA consultant, the Environmental Officer (EO), the contractors and other parties involved in the project implementation.

9.7.2 Roles and Core Duties of Different Players in EIA Project Implementation

9.7.2.1 Project Proponent

The project proponent is not only legally responsible for ensuring regulatory compliance, but is the driver for mainstreaming the environmental agenda in all stages of project implementation. The major roles and responsibilities of the PP include the following:

- i. Formulating an Environmental Policy (EP) of the company with respect to the EIA project, which shall be communicated to the stakeholders, consultants, contractors and other parties involved in the project planning and implementation.
- ii. Establishing an organizational structure which clearly shows the emplacement of a Registered EIA Consultant and an Environmental Officer (EO), where they are charged with specific responsibilities to ensure environmental aspects are taken into consideration and pollution prevention and mitigation measures (P2M2) are integrated into every stage of project planning and implementation.
- iii. Allocating sufficient funds for all steps in the EIA process and every stage of project planning and implementation with itemized budget required for water quality monitoring, air quality and noise monitoring, for comprehensive site survey and investigation of the specific existing site conditions, for implementation of Environmental Management Plan (EMP) including temporary pollution prevention and mitigation measures (P2M2). P2M2 shall be those which can be described as state of the art technologies, best available technologies (BATs), or industry best practices.

- iv. Appointing an Environmental Officer (EO), at the stage of post submission of EIA Report to be charged with responsibilities to execute environmental quality control and performance monitoring functions during the construction and operation phases of the project implementation. Service of an EO can also be obtained from an Environmental Officer Service Provider. Service of EO from EO service provider is allowed during the construction stage only. However, at the operational stage, the Project Proponent shall employ his own EO.
- v. Establishing a project Environmental Performance Monitoring Committee (EPMC) to monitor the environmental performance, effectiveness of pollution prevention and mitigation measures (P2M2) and status of regulatory compliance of the project. The EPMC shall be represented by all relevant parties involved in project implementation and chaired by a senior member representing the project proponent. The chairman who shall be formally appointed by the project proponent shall be responsible for ensuring the decisions of the meeting are responsibly executed. The EPMC shall meet at a minimum, once in a quarter and the minutes of the meeting shall be maintained.
- vi. Setting up a “mini laboratory”, wherever appropriate, to facilitate the implementation of environmental performance monitoring program. This mini laboratory shall be adequately equipped with relevant resources including staff and portable analytical testing equipment.
- vii. Ensuring the Environmental Management Plan (EMP) including temporary and permanent pollution prevention and mitigation measures (P2M2) are implemented and maintained according to industry’s best practices.

9.7.2.2 Environmental Consultant

The registered EIA Consultant is the key person who is entrusted with the responsibilities for ensuring environmental impacts from a project are correctly identified, assessed, and mitigated. The roles and core duties of the EIA Consultant include the following:

- i. Preparing the Terms of Reference (TOR) for EIA study of a project proposal;
- ii. Performing quality control (QC) to ensure the quality of EIA Report meets the requirements of DOE and hence, is fit for submission;
- iii. Preparing and defending the EIA Report of a project;
- iv. Setting up Public Display and Engagement Meetings; and
- v. Preparing the Environmental Management Plan (EMP).

9.7.2.3 Environmental Officer (EO)

The Environmental Officer (EO) is the main project personnel responsible for ensuring regulatory compliance at the project implementation stage (post submission of EIA Report).

The roles and core duties of the EO include the following:

- i. Implementing the environmental management plan (EMP), and installing the temporary and permanent pollution prevention and mitigation measures (P2M2).
- ii. Preparing Environmental Performance Monitoring Document (EPMD). PMD describes in detail how EIA approval conditions are going to be complied and how performance monitoring of the various pollution prevention and mitigation measures (P2M2) will be conducted to ensure the optimal functionality of the P2M2 is maintained. The details shall include, among others: performance monitoring equipment/instruments, sampling protocols and analysis, monitoring parameters, sampling frequency, preventive and corrective maintenance procedure for the P2M2, discharge compliance, record keeping, etc. EPMD also includes compliance monitoring (CM) and impact monitoring (IM) wherever relevant.
- iii. Performing or supervising the conduct of performance monitoring (PM) program as specified in the PMD.
- iv. Preparing Performance Monitoring Report (PMR). PMR discusses the results of the performance monitoring conducted as described in the PMD. Wherever relevant, PMR shall include data interpretation and assessment of the effectiveness of the pollution prevention and mitigation measures (P2M2) by making comparison of the performance monitoring parameters with their recommended ranges (or standards). Statistical techniques and graphical presentation of the performance monitoring parameters should be used wherever appropriate. PMR shall also make some definitive conclusions on the overall performance of the P2M2 and suggest improvement measures to be taken if necessary. PMR shall be submitted to the Environmental Performance Monitoring Committee (EPMC) as established by the Project Proponent for the EIA project and maintained for the inspection of the DOE officers.

- v. Communicating the status of environmental regulatory compliance of the project during construction and operation phases to the project proponent.
- vi. Maintaining a detailed record of major upset conditions encountered, if any, for the duration of the project construction and operation phases. The date of occurrence, nature and causes of upset conditions, and the corrective actions taken shall be recorded. Upset conditions refer to failures of pollution prevention and mitigation measures (P2M2) which result in noncompliance with the EIA approval conditions or discharge/emission standards, or pollution that affects the immediate neighbourhood or seriously threatens the environment or public health and safety.
- vii. Acting as an environmental advisor to the project proponent in advising him to undertake additional efforts, if any, to further ensure effective implementation environmental management plan (EMP) including temporary pollution prevention and mitigation measures (P2M2) on a sustained basis.

9.7.3 Mainstreaming Tools or Elements

In order to facilitate the compliance of EIA approval conditions, all aspects of environmental mainstreaming tools as per **Appendix 9.A** shall be implemented without fail.

With a lofty goal to develop an industrial society and those involved in development projects that have an intrinsic culture of pride in environmental excellence (EE), the DOE has embarked on a program entitled "Guided Self-Regulation". To assist the regulated community to achieve the state of self-regulation, the DOE has formulated in the organizations and industrial premises. The Environmental Mainstreaming Tools (EM Tools) include:

- i. Environmental Policy (EP);
- ii. Environmental Budgeting (EB);
- iii. Environmental Monitoring Committee (EMC);
- iv. Environmental Facility (EF);
- v. Environmental Competency (EC);
- vi. Environmental Reporting and Communication (ERC); and
- vii. Environmental Transparency (ET).

The EM tools are briefly explained in the following sections.

9.7.3.1 Environmental Policy (EP)

The Environmental Policy (EP) of successful organizations (i.e. CJSB) uses strong and unequivocal statements to convey their environmental commitment to their employees, clients, stakeholders and the public. The EP is disseminated to all relevant parties and translated into action in the organization's work procedures, materials purchasing policy, business decision making process and cascades down to the supply chain.

Cenviro (Johor) Sdn. Bhd. (CJSB), an Integrated Waste Management Centre, is in the business of providing off-site facility for the Scheduled Waste Treatment Facility in Southern Region of Peninsular Malaysia. Being a Socially Responsible Corporation, CJSB believed that sustainable development, in balancing development with the proper and safe disposal of scheduled and hazardous wastes is inevitable solution to providing safe future to the coming generations.

CJSB is committed to provide efficient and excellent services to their customers while safe guarding the safety and health of their employees and associates specifically, and the environment generally, by implementing the following guidance principles:

- Achieving continual improvement in the areas of Safety, Health, Environment and Quality Management of the Satellite Waste Management Centre;
- Ensuring compliance with applicable legal and other requirements relevant to their operations;
- Striving for recognition of Quality Services that meet customer's expectation;
- Preventing and minimising pollution to the best practicable means with the aim of preserving the natural environment and stakeholders affected by their operations;
- Inculcating a safe behaviour among employees and associates operating for CJSB to proactively minimise injuries and ill health from their workplace; and
- Promoting safe behaviour and practices among their service providers.

As the project proponent, CJSB is committed towards the incorporation of effective environmental procedures in their activities by developing and implementing significant environmental control measures.

9.7.3.2 Environmental Budgeting (EB)

Sufficient budget must be set aside solely for the purpose of taking measures to comply with the environmental regulatory requirement and other environmental-related efforts. At the design stage of SWMCJ, budget shall be available for the design and installation of the pollution control facilities, while at the operational stage, budget shall be allocated for proper operation and maintenance of pollution control systems and management of waste generated by the industry or project development. The environmental budget for SWMCJ will also include the cost for setting up of laboratory facilities, provision of personnel and purchase of performance monitoring equipment.

9.7.3.3 Environmental Monitoring Committee (EMC)

The success of an organization to comply with the environmental requirements is contingent upon the relevant personnel in different departments in the organization playing their role in an effective manner. To promote collective responsibility to be environmentally compliant, two (2) monitoring committees are set up: one (1) at the working level, the other at the policy level. At the working level, the committee known as the Environmental Performance Monitoring Committee (EPMC) is chaired by a senior official of the organization and it meets on a monthly basis, or at a minimum, once in a quarter. At the policy level, the committee is known as the Environmental Regulatory Compliance Monitoring Committee (ERCMC), which meets at a minimum, once a year. The chief executive officer or chairman of the organization chairs the ERCMC. CJSB shall organize the EMC prior to the operation of SWMCJ project.

9.7.3.4 Environmental Facility (EF)

The primary components of the Environmental Facilities (EFs) include industrial effluent treatment system, air pollution control system, best management practices, and associated support facilities such as laboratory, performance monitoring equipment, on-line instrumentation system and waste management infrastructure shall be implemented for SWMCJ project. The above form an integral part of the company's overall infrastructural planning, which cannot be compromised.

9.7.3.5 Environmental Competency (EC)

The relevant personnel involved in discharging various environmental responsibilities within an organization need to possess the required competencies. The personnel include those who have been assigned the task to perform DOE-regulated functions: to manage waste and supervise the operation of best management practices, air pollution control and effluent treatment systems. The organization must draw up a comprehensive training program to produce competent persons and trained support staff to ensure full compliance with the DOE requirements in the regulated activities.

A competent person or certified environmental professional is a person who has been certified by the Director General of the DOE to be competent to supervise the operation of an air pollution control system, industrial effluent treatment system or the management of scheduled wastes. The individual needs to go through the certification process and comply with all the requirements before he/she can be certified competent. CJSB shall ensure the personnel to be certified as a competent person in each respective field as presented in **Table 9.10**.

Table 9.10: List of Personnel to Be Certified As Competent Person for SWMCJ Project

No.	Field of Competency
1.	Course for Certified Environmental Professional in the Operation of Industrial Effluent Treatment Systems (Physical Chemical Processes) (CePIETSO (PCP))
2.	Course for Certified Environmental Professional in Bag Filter Operation (CePBFO)
3.	Course for Environmental Professional in Scrubber Operation (CEPSO)
4.	Course for Certified Environmental Professional in Scheduled Waste Management (CePSWaM)

9.7.3.6 Environmental Reporting and Communication (ERC)

A formal communication channel for CJSB organization shall be established for reporting environmental concerns and system upsets which warrant prompt actions to be instituted. Internal reporting can be initiated to report on a regular basis the regulatory compliance status of the organization to the Chief Executive Officer (CEO) and various heads of the department within the organization. Updates of new environmental requirements and their implications can be disseminated to the relevant company personnel. ERC requires systematic analysis of PM data, which must be summarized in appropriate format for easy understanding and communication and maintained for management review purposes.

9.7.3.7 Environmental Transparency (ET)

To foster rapport with the immediate neighbours, promote green image, and improve public confidence, companies are encouraged to be more transparent in their environmental compliance and achievement. Compliance status can be displayed on Company Website (WB) or Billboard (BB) located at the boundary or entrance to the company's premise, or communicated to the immediate neighbours through issuance of fliers on a scheduled basis. An Environmental Sustainability Report (ESR) can be prepared for the company to showcase its success in managing the environmental concerns of the company and minimizing the environmental footprint of its business. The corporate image of the organization is markedly enhanced through environmental transparency. Currently, Cenviro Group Company have established the ET, the public can access the information related to environmental matters through the website, yearly environmental sustainability report and etc. CJSB shall implement ET prior to their operation of project in 2019.

9.7.3.8 Conclusion: Environmental Mainstreaming Leads To Environmental Excellence

Rigorous implementation of the above EM tools by the regulated sectors will result in creating organizations and businesses, which are successful and at the same time take pride in their achievement of environmental excellence (EE). EE is exhibited in the intrinsic values of being environment conscious, achievement of sustained environmental regulatory compliance, high degree of environmental transparency and accountability, and strong commitment to continuous environmental improvement. Highly successful organizations are also exemplary in the environmental compliance and achievements, which go beyond regulatory requirements.

9.8 Emergency Response Plan (ERP)

An Emergency Response Plan (ERP) is an essential component of a facility's safety and loss strategy. It provides an organized structure for a chain of action to be put into motion in the event of an emergency at the site. An emergency, in the context of the ERP, is defined as an accident which has the potential to cause injury or loss of life, and/or damage to property and surrounding environment. An emergency is any unplanned event that can cause deaths or injuries to employees, customers or the public; or that can shut down a business, disrupt operations, cause physical or environmental damage, or threaten the facility's financial standing or public image. The purposes of ERP are as follow:-

- i) To outline the steps required in the event of an emergency occurring within the project area;
- ii) To ensure all injured persons received the best medical attention as quickly as possible;
- iii) To stabilize or control immediate hazards and recommend action to be taken to isolate and secure areas;
- iv) To keep the sites clear of any unauthorized persons after an emergency for their own safety and the safety of the public;
- v) To communicate promptly with corporate representatives at the appropriate levels;
- vi) To ensure prompt compliance with reporting requirements of the regulatory agencies;
- vii) To direct all media contact through corporate spokesman; and
- viii) To ensure prompt notification and frank disclosure to proponent's insurers.

Examples of events which can be considered emergencies for this proposed project are fire, accidents, contamination or pollution of water sources. Emergency response management is the process of preparing for mitigating, responding to and recovering from an emergency. Emergency response management is a dynamic process. Planning, though critical, is not the only component. Training, conducting drills, testing equipment and coordinating activities with the community are other important functions. To be successful, emergency response management requires upper management support. The chief executive officer sets the tone by authorizing planning to take place and directing senior management to get involved. Among others, the advantage of having a properly designed ERP includes:

- i) It helps companies to protect employees, the community and the environment;
- ii) It facilitates compliance with regulatory requirements;
- iii) It enhances a company's ability to recover from financial losses, regulatory fines, loss of market share, damages to equipment or products or business interruption;
- iv) It reduces exposure to civil or criminal liability in the event of an accident;
- v) It enhances a company's image and credibility; and
- vi) It reduces the company insurance premiums.

An ERP organization is depicted in **Figure 9.4**.



Figure 9.4: The Example of Tier 1/2/3 ERP Organization

The mission of this ERP is to maximize the use of combined resources of the proposed facility at Cenviro (Johor) Sdn. Bhd. (CJSB) and also with the Bomba, Police, Hospitals, Jabatan Pertahanan Awam Malaysia (JPAM) and other related agencies during an accident to:

- i) Control and/or extinguish fires or explosions;
- ii) Contain leakages or spillages;
- iii) Rescue people and bring for treatment if necessary;
- iv) Safeguard human lives; or
- v) Minimize damage to property and environment.

9.8.1 Implementation of Safety and Training Programme

Like all the industrial activities, there are inherent hazards associated with the operation of thermal treatment plant, waste handling, transportation and storage. The accident may occur within the site infrastructure i.e. site roads, sharp bends and steep gradients. Examples of accidents and possible failures from this proposed project are vehicle or fire accident, structural failure, landslides and waste slippage.

Accidents can be minimized by the implementation of Safety and Training programme towards the workers. Therefore, the workers will have good knowledge about the risk and ways to mitigate it from happen. These programmes should include as followings:

- i. Identification of potential sources of risk;
- ii. Assessment of the degree of risk from these sources;
- iii. Determination of procedures for addressing the risks;
- iv. Development of procedures to minimise accident/risks when it occurs; and
- v. On going monitoring to ensure proper implementation of site working procedures.

9.8.1.1 Identification of Potential Sources of Risk

All hazards related to the proposed project should be identified. A contingency plan with respect to each hazard should be made. The possible hazard associated with the project is either a fire or the possible discharge of untreated leachate from the containment should be notified. Each of the potential sources of the risk should be monitored regularly in order to prevent any possible incidents to happen.

9.8.2 Emergency Response Team (ERT)

Emergency response team will be situated at the CJSB site. All requests for assistance in the case of an accident involving scheduled waste will be directed to the CJSB. Depending on the situation, either direct assistance or verbal assistance will be provided. The emergency response team will consist of specially trained staff working at normal working hours. During off-duty, the team members will be on call.

9.8.3 Execution of Emergency Response Procedures

The purpose of this ERP is to ensure that any form of emergency, which interrupts normal and safe working conditions at the proposed facilities. Operational procedures are spelt out to enable a coordinated plan of action to be carried out to control the emergency situation and to restore it back to normal.

9.8.3.1 Procedures of Evacuating Employees and Visitors

If an incident occurs, a unit headed by the Incident Commander should establish command and assess the scene. Sample format of the evacuation announcement is as follows:

"Attention all employees and visitors. There is a major fire at please remain calm. Everybody shall leave his/her workplace immediately and proceed to assemble at ..."

The Incident Commander will determine the required levels of protection for responders and community members that may be exposed, determine the need for additional resources, and coordinate the response of other agencies. The Incident Commander also determines the appropriate protective action for the community, which can include sheltering in place or evacuation.

9.8.3.1.1 Direction and Control

The system for managing resources, analyzing information and making decisions in an emergency is called direction and control. For the proposed satellite waste management centre, since the number of workers as well as the population in the surrounding community is relatively small, the structure for command control shall be relatively simple.

a) Crisis Management Team (CMT)

The CMT is the team responsible for big incidents. It controls all incident-related activities. The Incident Commander (IC) oversees the technical aspects of the response. The CMT supports the IC by allocating resources and by interfacing with the community, the media, outside response organizations and regulatory agencies. The CMT is headed by the Emergency Director (ED), who should be the facility manager. The ED is in command and control of all aspects of the emergency. Other CMT members should be senior managers who have the authority to:

- i) Determine the short and long term effects of an emergency;
- ii) Order the evacuation or shutdown of the facility;
- iii) Interface with outside organizations and the media; and
- iv) Issue press releases.

b) Incident Command System (ICS)

The ICS provides for coordinated response and a clear chain of command and safe operations. The Incident Commander (IC) is responsible for front-line management of the incident, for tactical planning and execution, for determining whether outside assistance is needed and for relaying requests for internal resources or outside assistance through the Emergency Operations Centre (EOC). The IC can be any employee, but a member of management with the authority to make decisions is usually the best choice. The IC must have the capability and authority to:

- Assume command;
- Assess the situation;
- Implement the ERP;
- Determine response strategies;
- Activate resources;
- Order an evacuation;
- Oversee all incident response activities; and
- Declare that the emergency is over.

The relationships between the EMG and the ICS is summarised by **Figure 9.5**.

c) Emergency Operations Centre (EOC)

The EOC serves as a centralized management centre for emergency operations. Here, decisions are made by the EMG based upon information provided by the IC and other personnel. The EOC is a dedicated area equipped with communications equipment and all the tools necessary to respond quickly and appropriately to an emergency.

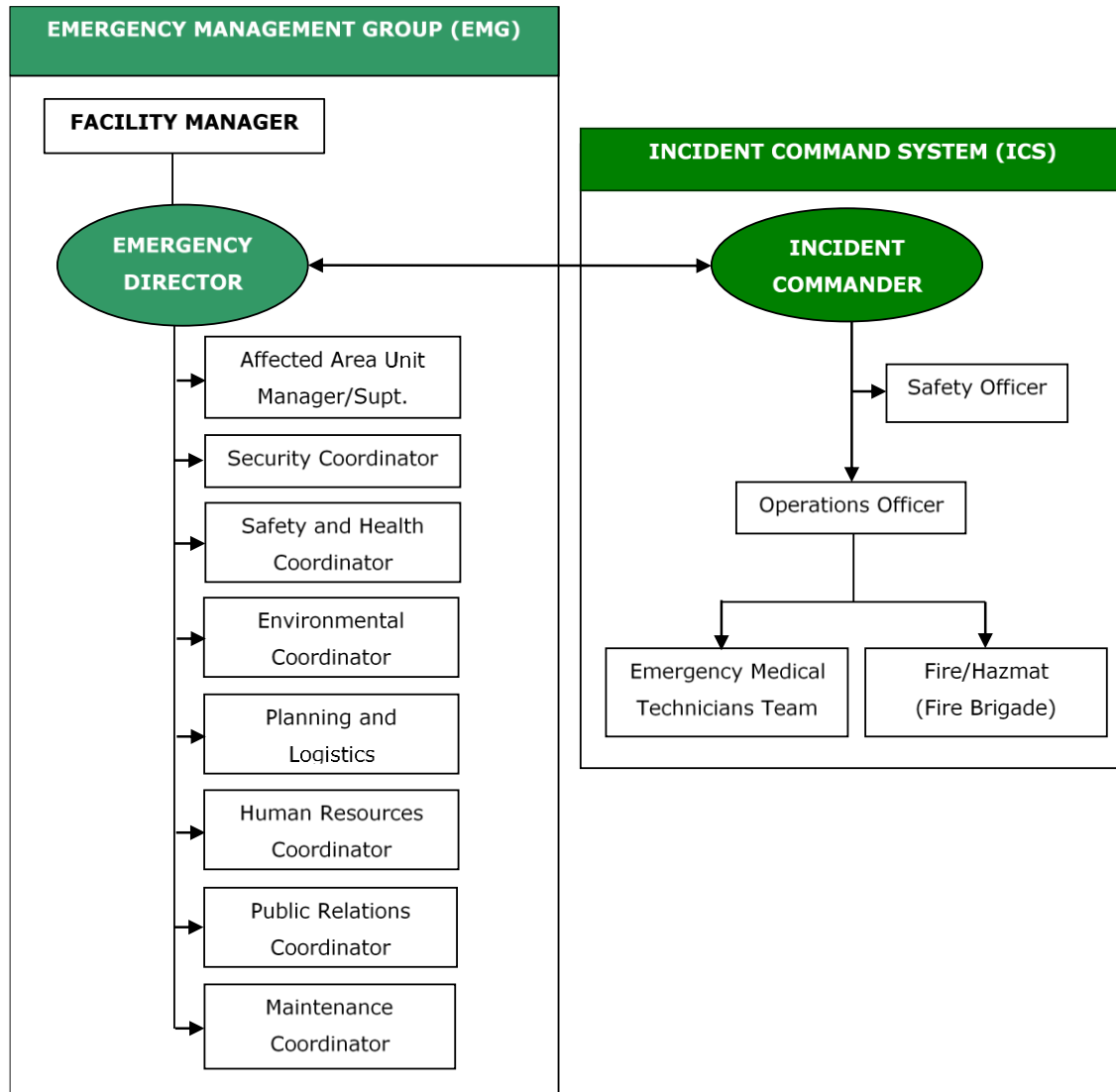


Figure 9.5: The Relationship between the EMG and the ICS

9.8.3.1.2 Communication

Communications are needed to report emergencies, to warn personnel of the danger, to keep families and off-duty employees informed about what's happening at the facility to coordinate response actions and to keep in contact with customers and suppliers.

a) Contingency Planning of Communication

Contingency plan for temporary or short term disruption to a total communications failure must be established. In case of failures, procedures for restoring communications systems via some agreed arrangements with the communication vendors must be ascertained. The options to include communication system such as messengers, telephones, portable microwave, amateur radios, point-to-point private lines, satellite or high-frequency radio is necessary.

b) Emergency Communications

Systems to facilitate the communication between the various emergency management respondents must be clearly stated and in-place. These include the requirement for effective communications between:

- Emergency responders;
- Responders and the Incident Commander (IC);
- The IC and the Emergency Operations Centre (EOC);
- The IC and employees;
- The EOC and outside response organizations;
- The EOC and neighbouring businesses;
- The EOC and employees' families;
- The EOC and customers; and
- The EOC and media.

The system is tested at reasonable frequency. In addition, the alarm systems are tested on a monthly basis. Methods of communication include telephone, two-way radio, fax machine, satellite, dial-up modems, local area networks, hand signals and PA system.

c) Family Communications

During an emergency, employees need to know whether their families are safe and therefore proper plan for communication with families for all employees must be designed. Also, encourage employees to:

- Consider how they would communicate with their families in case they are separated from one another or injured in an emergency;
- Arrange for an out-of-town contact for all family members to call in an emergency; and
- Designate a place to meet family members in case they cannot get home in an emergency.

d) Notification

Procedures for employees to report an emergency must be clearly spelled out and employees must be well-informed on the issue. Emergency telephone numbers are posted near each telephone, on employee bulletin boards and in other prominent locations. Updated list of addresses and telephone and pager numbers of key emergency response personnel (from within and outside the facility) are maintained. Notification is made immediately to local government agencies when an emergency has the potential to affect public health and safety. The list of local government agencies are as **Figure 9.6** until **Figure 9.8**.



Figure 9.6: Nearest Fire and Rescue Station



Police Headquarter Johor

Jalan Tebrau,
80990 Johor Bahru, Johor.
07 – 2254422

Police Station Kota Tinggi

JKR 102, Jalan Omar,
81900 Kota Tinggi, Johor.
07 - 8831222

Police Station Pengerang

81600 Pengerang, Kota Tinggi,
Johor.
07 - 8252222

Police Station Sungai Rengit

JKR P910, Jalan Pasar,
81620 Kota Tinggi, Johor.
07 - 8263222

Police Station Bandar Penawar

Jalan Dato' Muhammad,
81900 Bandar Penawar, Johor.
07 – 8221122

Figure 9.7: Nearest Police Station

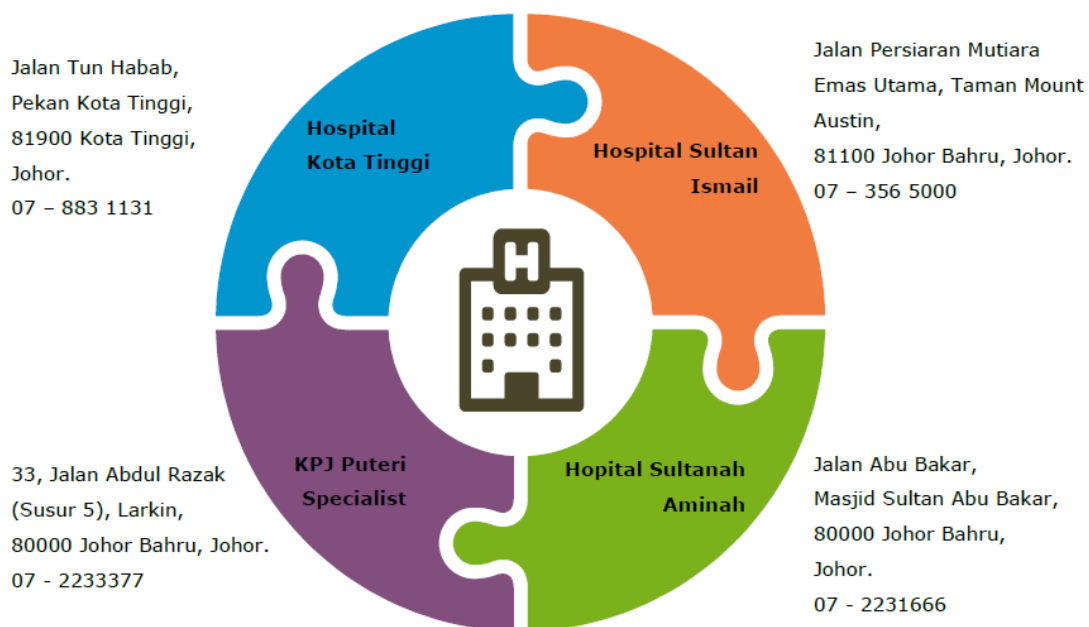


Figure 9.8: Nearest Hospitals

e) Alarms

Procedures for employees to report an emergency must be clearly spelled out and employees must be well-informed on the issue. Emergency telephone numbers is posted near each telephone, on employee bulletin boards and in other prominent locations. Updated list of addresses and telephone and pager numbers of key emergency response personnel (from within and outside the facility) are to be maintained. Notification must be made immediately to local government agencies when an emergency has the potential to affect public health and safety.

f) Warning

Effective warning system must be configured. The system should be audible or within view by all people in the facility, have an auxiliary power supply and have a distinct and recognizable signal. The system should be instantaneous such that effectively 30 minutes are available for the intended evacuation. The system should be tested at least once a month.

9.8.3.1.3 Human Safety

Protecting the health and safety of everyone in the facility is the first priority during an incident or emergency. In this case, it involves an evacuation of employees and visitors during major fire or accidents.

a) Evacuation Planning

One common means of protection is evacuation. In the case of fire or accident, an immediate evacuation to a predetermined area away from the facility is necessary.

b) Evacuation Routes and Exits

Designate primary and secondary evacuation routes and exits are clearly marked and well lit. Emergency lighting is strategically installed in case of power outage occurs during an evacuation. The evacuation routes and emergency exits are:

- Wide enough to accommodate the number of evacuating personnel;
- Clear and unobstructed at all times; and
- Unlikely to expose evacuating personnel to additional hazards. Have evacuation routes evaluated by someone that is not in the organization.

Considerations on how to access important personal information about employees (home phone, next-of-kin, medical etc.) in case of emergency, are stored and made available on computer database or cloud.

c) Assembly Areas and Accountability

The number of head count at assembly areas will depend on the employees and visitors present at the site. In case on an incident, with proper warning system, all personnel will be directed to the assembly area. The procedures below are followed:

- Designate assembly areas where personnel should gather after evacuating;
- Take a head count after the evacuation. The names and last known locations of personnel not accounted for are determined and given to the EOC. (Confusion in the assembly areas can lead to unnecessary and dangerous search and rescue operations);
- Establishment of method for accounting for non-employees such as suppliers and customers through registration; and
- Establishment of procedures for further evacuation in case the incident expands. This may consist of sending employees home by means or providing them with transportation to an off-site location.

d) Shelter

In some emergencies, the best means of protection is to take shelter either within the facility or away from the facility in a public building.

- i) Consider the conditions for taking shelter;
- ii) Identify shelter space in the facility and in the community. Establish procedures for sending personnel to shelter;
- iii) Determine needs for emergency supplies such as water, food and medical supplies;
- iv) Designate shelter managers, if appropriate; and
- v) Coordinate plans with local authorities.

e) Training and Information

Train employees in evacuation, shelter and other safety procedures. Conduct sessions at least annually or when:

- i) Employees are hired;
- ii) Evacuation wardens, shelter managers and others with special assignments are designated;
- iii) New equipment, materials or processes are introduced;
- iv) Procedures are updated or revised; or
- v) Exercises show that employee performance must be improved.

Provide emergency information such as checklists and evacuation maps. Post evacuation maps in strategic locations. Consider the information needs of customers and others who visit the facility.

9.8.4 Property Protection

Protecting facilities, equipment and vital records is essential to restoring operations once an emergency has occurred.

9.8.4.1 Planning Considerations

Establish procedures for:

- i) Fighting fires;
- ii) Containing material spills;
- iii) Closing or barricading doors and windows;
- iv) Shutting down equipment;
- v) Covering or securing equipment;
- vi) Moving equipment to a safe location; and
- vii) Identify sources of backup equipment, parts and supplies.

Designate personnel to authorize, supervise and perform a facility shutdown. Train them to recognize when to abandon the effort. Obtain materials to carry out protection procedures and keep them on hand for use only in emergencies.

9.8.4.2 Protection Systems

Determine the needs for systems to detect abnormal situations provide warning and protect property. Consider the followings:

- i) Fire protection systems;
- ii) Lightning protection systems;
- iii) Automatic shutoffs; and
- iv) Emergency power generation systems.

9.8.4.3 Mitigation

Consider ways to reduce the effects of emergencies, such as using the highest standards of materials and parts for LNG piping and diesel tank. Other physical retrofitting measures include installing fire sprinkler systems or fire-resistant materials and furnishing.

9.8.4.4 Facility Shutdown

Facility shutdown is generally a last resort but always a possibility. Improper or disorganized shutdown can result in confusion, injury and property damage. Some facilities require only simple actions such as turning off equipment, locking doors and activating alarms. Others require complex shutdown procedures. Train personnel and establish shutdown procedures. Include information about when and how to shut off utilities. Identify:

- i) The conditions that could necessitate a shutdown;
- ii) Who can order a shutdown;
- iii) Who will carry out shutdown procedures;
- iv) How a partial shutdown would affect other facility operations; and
- v) The length of time required for shutdown and restarting.

9.8.4.5 Records Preservation

Preserving vital records is essential to the quick restoration of operations. Vital records may include:

- i) Financial and insurance information;
- ii) Engineering plans and drawings;
- iii) Product lists and specifications;
- iv) Employee, customer and supplier databases;
- v) Formulas and trade secrets; and
- vi) Personnel files.

Next, establish procedures for protecting and accessing vital records. Among the many approaches to consider are:

- i) Labelling vital records and backing up computer systems;
- ii) Making copies of records;
- iii) Storing tapes and disks in insulated containers;
- iv) Storing data off-site where they would not likely be damaged by an event affecting your facility;
- v) Increasing security of computer facilities;
- vi) Arranging for evacuation of records to backup facilities;
- vii) Backing up systems handled by service bureaus; and
- viii) Arranging for backup power.

9.8.5 Coordination with Outside Organizations

Meet periodically with local government agencies and community organizations. Inform appropriate government agencies that you are creating an emergency management plan. While their official approval may not be required, they will likely have valuable insights and information to offer. Determine state and local requirements for reporting emergencies, and incorporate them into your procedures. Determine protocols for turning control of a response over to outside agencies. Determine what kind of identification authorities will require to allow your key personnel into your facility during an emergency.

9.8.6 Recovery and Restoration

Immediately after an emergency, take steps to resume operations.

- i) Establish a recovery team, if necessary. Establish priorities for resuming operations.
- ii) Continue to ensure the safety of personnel on the property. Assess remaining hazards. Maintain security at the incident scene.
- iii) Conduct an employee briefing.
- iv) Keep detailed records. Consider audio recording all decisions. Take photographs of or videotape the damage.
- v) Account for all damage-related costs. Establish special job order numbers and charge codes for purchases and repair work.
- vi) Follow notification procedures. Notify employees' families about the status of personnel on the property. Notify off duty personnel about work status. Notify insurance carriers and appropriate government agencies.
- vii) Protect undamaged property. Close up building openings. Remove smoke, water and debris. Protect equipment against moisture. Restore sprinkler systems. Physically secure the property. Restore power.
- viii) Conduct an investigation. Coordinate actions with appropriate government agencies.
- ix) Conduct salvages operations. Segregate damaged from undamaged property.
- x) Take an inventory of damaged goods.
- xi) Restore equipment and property. For major repair work, restoration plans with the insurance adjuster and appropriate government agencies.
- xii) Assess the value of damaged property. Assess the impact of business interruption.
- xiii) Maintain contact with customers and suppliers.

9.8.7 Administration and Logistics

Maintain complete and accurate records at all times to ensure a more efficient emergency response and recovery. Certain records may also be required by regulation or by insurance carriers or prove invaluable in the case of legal action after an incident.

Emergency funding can be critical immediately following an emergency. Consider the need for pre-approved purchase requisitions and whether special funding authorities may be necessary.

9.8.8 Support Documents

9.8.8.1 Building and Site Maps

To facilitate the ERP, the site map that indicate utility shutoffs, water hydrants, water main valves, water lines, gas main valves, gas lines, electrical cut offs, electrical substations, drains, sewer lines, location of each building (include name of building, street name and number), floor plans, alarm and enunciators, fire extinguishers, fire suppression systems, exits, stairways, designated escape routes, restricted areas, hazardous materials (including cleaning supplies and chemicals) and high-value items must be provided.

9.8.8.2 Resource Lists

Lists of major resources (equipment, supplies and services) that could be needed in an emergency are the mutual aid agreements with other companies and government agencies.

9.8.9 ERP Implementation

Emergency response plan implementation is to integrate the ERP into company operations, training employees and evaluating the plan.

9.8.9.1 Integrate the Emergency Response Plan into Company Operations

Emergency Response Plan must become part of the corporate culture. Look for opportunities to build awareness; to educate and train personnel; to test procedures; to involve all levels of management, all departments and the community in the planning process; and to make emergency management part of what personnel do on a day-to-day basis. The following questions need to be addressed:

- i) The management support of the emergency response plan.
- ii) The incorporation of emergency response planning concepts into the facility's accounting, personnel and financial procedures.
- iii) Opportunities for distributing emergency preparedness information through corporate newsletters, employee manuals or employee mailings.
- iv) Safety awareness of all employees.
- v) The level of understanding of employees of what they should do in an emergency.
- vi) How can all levels of the organization be involved in evaluating and updating the plan.

9.8.9.2 Employee Training

Everyone who works at or visits the facility requires some form of training. This includes periodic employee discussion sessions to review procedures, technical training in equipment use for emergency responders, evacuation drills and full-scale exercises. Below are basic considerations for developing a training plan. Training can take many forms such as:

- i) **Orientation and Education Sessions** where scheduled discussion sessions to provide information, answer questions and identify needs and concerns.
- ii) **Tabletop Exercise** where members of the emergency response management group meet in a conference room setting to discuss their responsibilities and how they would react to emergency scenarios. This is a cost-effective and efficient way to identify areas of overlap and confusion before conducting more demanding training activities.
- iii) **Walk-through Drill** where emergency response management group and response teams actually perform their emergency response functions. This activity generally involves more people and is more thorough than a table top exercise.
- iv) **Functional Drills** where drills test specific functions such as medical response, emergency notifications, warning and communications procedures and equipment, though not necessarily at the same time. Personnel are asked to evaluate the systems and identify problem areas.
- v) **Evacuation Drill** where personnel walk the evacuation route to a designated area where procedures for accounting for all personnel are tested. Participants are asked to make notes as they go along of what might become a hazard during an emergency, e.g. stairways cluttered with debris, smoke in the hallways. Plans are modified accordingly.

- vi) **Full-scale Exercise** where a real life emergency situation is simulated as closely as possible. This exercise involves company emergency response personnel, employees, managements and community response organizations.

General training for all employees should address the followings:

- i) Individual roles and responsibilities;
- ii) Information about threats, hazards and protective actions;
- iii) Notification, warning and communications procedures;
- iv) Means for locating family members in an emergency;
- v) Emergency response procedures;
- vi) Evacuation, shelter and accountability procedures;
- vii) Location and use of common emergency equipment; and
- viii) Emergency shutdown procedures.

9.8.9.3 Evaluate and Modify the Emergency Response Plan

ERP needs to be audited or evaluated at least once a year. Among the issues which are pertinent in the emergency response plan are:

- i) The involvement of all levels of management in evaluating and updating the plan;
- ii) The problem areas and resource shortfalls identified in the vulnerability analysis are being sufficiently addressed;
- iii) The plan reflects lessons learned from drills and actual events;
- iv) The members of the emergency response management group and emergency response team understand their respective responsibilities;
- v) The plan reflects changes in the physical layout of the facility;
- vi) Records of facility assets up to date;
- vii) The names, titles and telephone numbers in the plan are current; and
- viii) The community agencies and organizations been briefed on the plan.