

Competency-Based Learning Materials

Maintaining Training Facilities



Technical Education and Skills Development Authority
National TVET Trainers Academy
Marikina City



TESDA

Competency-Based Learning Materials

***Maintaining Training
Facilities***

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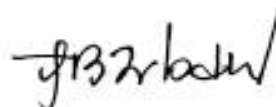
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TO GOD BE THE GLORY!



FELICIDAD B. ZURBANO

Director III

National TVET Trainers Academy

HOW TO USE THIS COMPETENCY-BASED LEARNING MATERIALS

Welcome to the module in Maintaining Training Facilities. This module contains training materials and activities for you to perform and complete.

The unit of competency “Maintain Training Facilities” contains knowledge, skills and attitudes required for TRAINERS METHODOLOGY (TM) Level I.

You are required to go through a series of learning activities in order to complete each learning outcome of the module. In each learning outcome are *Information Sheets, Self-Checks, and Task Sheets*. Follow these activities on your own. If you have questions, do not hesitate to ask your facilitator for assistance.

The goal of this course is the development of practical skills. To gain these skills, you must learn basic concepts and terminologies. For the most part, you will get this information from the Information Sheets and TESDA Website, www.tesda.gov.ph

This module was prepared to help you achieve the required competency in "***Maintaining Training Facilities***".

This will be the source of information for you to acquire knowledge and skills in this particular competency independently and at your own pace, with minimum supervision or help from your instructor.


Remember to:

- Work through all the information and complete the activities in each section.
- Read information sheets and complete the self-check. Suggested references are included to supplement the materials provided in this module.
- Perform the Task Sheets and Job Sheets until you are confident that your outputs conform to the Performance Criteria Checklist that follows the sheets.
- Submit outputs of the Task Sheets and Job Sheets to your facilitator for evaluation and recording in the **Accomplishment Chart**. Outputs shall serve as your portfolio during the Institutional Competency Evaluation. When you feel confident that you have had sufficient practice, ask your Trainer to evaluate you. The results of your assessment will be recorded in your Progress Chart and Accomplishment Chart.

You must pass the Institutional Competency Evaluation for this competency before moving to another competency. A Certificate of Achievement will be awarded to you after passing the evaluation.

When you feel confident that you have had sufficient practice, ask your Trainer to evaluate you. The results of your assessment will be recorded in your **Record of Achievement** and reflected in your **Progress Chart and/or Achievement Chart**.

You need to complete this module before you can perform the module on **Facilitate Learning Sessions**.

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TRAINERS METHODOLOGY LEVEL I COMPETENCY-BASED LEARNING MATERIALS

List of Competencies


| No. | Unit of Competency | Module Title | Code |
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| 1. | Plan Training Session | Planning Training Session | TVT232301 |
| 2. | Facilitate Competency-Based Training | Facilitating Competency-Based Training | TVT232302 |
| 3. | Supervise Work-Based Learning | Supervising Work-Based Learning | TVT232303 |
| 4. | Conduct Competency Assessment | Conducting Competency Assessment | TVT232304 |
| 5. | Maintain Training Facilities | Maintaining Training Facilities | TVT232305 |
| 6. | Utilize Electronic Media in Facilitating Training Session | Utilizing Electronic Media in Facilitating Training Session | TVT232306 |

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MODULE CONTENT

UNIT OF COMPETENCY : Maintain Training Facilities

MODULE TITLE : Maintaining Training Facilities

MODULE DESCRIPTOR :


This module covers the knowledge, skills and attitude required of a trainee to perform task and activities to keep the training environment in a functional and safe condition.


NOMINAL DURATION: 16 hours

SUMMARY OF LEARNING OUTCOMES:

At the end of this module, you must be able to:

1. Plan maintenance activities
2. Implement housekeeping activities
3. Maintain training equipment and tools
4. Document maintenance inspection

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| LEARNING OUTCOME 1 | PLAN MAINTENANCE ACTIVITIES | | | |
|---|--|--|----------------------|--------------|
| CONTENTS: <div>1. Training facilities and equipment</div> <div>2. Importance of maintenance</div> <div>3. Maintenance methods and systems</div> | | | | |
| ASSESSMENT CRITERIA: <div>1. Training facilities and equipment are identified</div> <div>2. Requisition for instructional equipment, tools, supplies and materials are prepared according established procedures</div> <div>3. Training equipment, tools, materials/supply inventory are prepared</div> <div>4. Equipment, tools, supplies and materials option are thoroughly researched and ergonomic requirements are considered</div> <div>5. Equipment, tools, supplies and materials are identified and justified</div> <div>6. Equipment and systems impact on trainees are accurately documented according to procedures</div> <div>7. Maintenance activities are established according to policies</div> <div>8. Areas/Equipment to be maintained are identified</div> <div>9. Maintenance activities, resources are identified and schedule is prepared according to job requirements</div> <div>10. Technical support services are identified as necessary</div> | | | | |
| CONDITIONS: The trainees must be provided with the following: <div><div>• Training Resources<div><div>- References (books)</div><div>- Audio/Video materials</div><div>- Modules/Manuals</div><div>- Tools</div><div>- Materials/Consumables</div></div></div><div>• Training Facilities/Area<div><div>- Work stations</div><div>- Equipment/Machines</div><div>- Furniture/Fixtures</div></div></div></div> | | | | |
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METHODOLOGIES:

- Group discussion
- Simulation
- Lecture
- Self-learning/Self-pace instruction

ASSESSMENT METHODS:

- Written Test
- Demonstration/Questioning


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LEARNING EXPERIENCE

Learning Outcome 1

PLAN MAINTENANCE ACTIVITIES

| Learning Activities | Special Instructions |
|--|---|
| Read Information Sheet 5.1-1 on Training Facilities and Equipment | <p>For additional information, you may refer to your Institutional Development Plan, Workshop Layout Organizational Maintenance System or Procedures, RA 8749 and RA 9003, for additional information and for you to be able to perform the task sheets.</p> <p>In comparing your answers from the model answer, be sure that all your answers are correct before proceeding to the next activity.</p> <p>In performing the task sheets, compare your output with the sample template provided in the Information Sheet/s. Assess/Evaluate your work according to the performance criteria checklist. Make the corrections or improvements, necessary.</p> <p>Secure the evaluation of your outputs by your trainer and let him record your accomplishments.</p> <p>Upon completion of these activities, you may proceed to the next LO on Implement Housekeeping Activities.</p> <p><i>Note: Full text of RA 9003 and RA 8749 are attached in the module.</i></p> |
| Answer the self-check to measure your knowledge on the topic. Compare with the model answer. | |
| Read Information Sheet No. 5.1-2 on Importance of Maintenance. | |
| Answer the self-check to measure your knowledge on the topic. Compare with the model answer. | |
| Read Information Sheet 5.1-3 on Maintenance Methods and Systems. | |
| Answer the self-check to measure your knowledge on the topic. Compare with the model answer. | |
| Perform Task Sheet No. 5.1-3a on Prepare Housekeeping Schedule. | |
| Perform Task Sheet No. 5.1-3b on Prepare Equipment Maintenance Schedule | |
| Perform Task Sheet No. 5.1-3c on Prepare Housekeeping Checklist | |
| Perform Task Sheet No. 5.1-3d on Prepare Equipment Maintenance Checklist. | |

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INFORMATION SHEET 5.1-1

Training Facilities and Equipment

Learning Objective: After reading this INFORMATION SHEET, you must be able to identify and describe the training facilities and equipment in your center or school in order to determine its maintenance requirements.

Trainers, as they embark on teaching and learning activities, are also involved in the maintenance and upkeep of the workshop/classroom and its surroundings especially in small training centers. They must ensure that facilities, equipment and tools are adequate, available and in operating condition. This is premised that a healthy, safe and worry-free working environment promotes good performance, morale and well-being of the students and the whole school community.

Training Facilities and Equipment


Training facilities are structures provided for learning purposes. Training facilities include classrooms, workshops, laboratory, library and utilities such as lighting, water, drainage and sewage, as required in carrying out the transfer of knowledge and skills. Training facilities also cover **built structures** such as buildings (single and multi-purpose), tracks, walkways and plants (fixtures, infrastructure and superstructure).



Facilities in a traditional training delivery are very different from a competency-based training facility where trainees have to master all the required competencies of their training qualification. For this reason, TESDA has identified the different components of competency-based


training facilities as follows:

1. **Practical Work Area** – This area is where the trainee acquires the skills and knowledge components of the competencies prescribed by the standard.
2. **Learning Resource Center** - This area is proximate to the heart – the practical work area. This area provides the trainee with the *knowledge requirements in the various modules responding to the competencies*. It is a place where projects can be planned and self-paced learning is based. This area has an array of learning materials in print or soft-copies for a multimedia environment.

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3. **Institutional Assessment Area** – It is located very proximate to the practical work area. This is where *recognition of prior learning* is done by the trainer. This component also provides the mechanism of assessing the completion of competencies of a trainee. Upon completion of all modules within a competency, the trainee is handed a Certificate of Achievement. This facility is provided with a computer system that houses and manages trainees' individual records.
4. **Contextual Learning Laboratory** – This facility ensures that the underpinning knowledge, the science, mathematics and communication principles as applied to the technology are provided to the trainee.
5. **Quality control** – Various tests aside from metrology and calibration are conducted in this area including in-process quality control. Here, finished products generated from the training are scrutinized if standards or requirements are met.
6. **Trainers Resource Area** – This area houses the learning materials, the training regulations and curriculum exemplars. This is also the place where instructors produce courseware or training materials.
7. **Distance Learning Area** – One major issue of TVET is accessibility. This is the major objective of this component – enhance accessibility of TVET. This is to enable the learning provision outside and away from the training institution in the term of print and non-print media. At present, this is implemented in selected qualifications and training centers with Internet connections.
8. **Computer Laboratory** – This area depicts the major physical change in the delivery – the use of Information technology. This laboratory has an array of computer units where trainee are provided to learn and gain appropriate IT competencies that may include Word, Excel even Desktop Publishing as may be prescribed in the competency standard and curriculum. Computer units are in a LAN environment hooked to an ISP for Internet access.



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Attributes of Training Facilities


A training facility for adult must have flexible and technologically advanced environment that are safe, healthy, comfortable, aesthetically pleasing, and accessible. It must be able to accommodate the specific space and equipment needs that allow students to carry out some functions or activities during their training sessions.

Training facilities and equipment have different attributes. The *size* and *structure* of these areas are of different standards particularly those of workshops or practical work areas. Among the considerations are the *size of equipment* and the *space required* while using them, the *type of activities* necessary to perform or demonstrate the competencies of the qualification, and the *conditions required of the facility* such that the make-up of floor or ceiling maybe distinct from one qualification to another. The reference, of course, is the training regulation of the course/qualification.

It is typical, for the *floor of a commercial cooking area* to be tiled and provided with drainage for easy cleaning and drying (for safety as well as hygiene and sanitation purposes). Those in the **construction courses** are commonly with plain cement or unfinished floors. **Welding** workshops on the other hand, are normally equipped with *ventilation/exhaust facilities* to minimize the heat brought about by the operation of motor engine and other machines as well as to eliminate fumes that are destructive to health and for safety. Other courses need amenities in its work environment such as in **Housekeeping, Health Care Services** and **Beauty Care**.

Likewise, many courses are dependent on the electrical power such as in **Computer Hardware Servicing, Mechatronics**, and **Welding** while others require the steady supply of water and provision of adequate drainage such as in Plumbing and Commercial Cooking. Hence, the maintenance of electrical, water, drainage, and ventilation systems is of great importance to ensure continuity of training and effect quality learning environment.



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Training Equipment and Supplies


Training equipment is usually placed in the practical work area or the trainee resource area. The *sizes and uses* of equipment vary in the different training qualifications and generally classified into five (5):

1. large items of equipment – motor vehicles, industrial sewing machines
2. small items of equipment – video/tape recorder, espresso machine
3. simple equipment – electric fan, floor polisher
4. complex equipment – plasma cutting machine, simulator (automotive)
5. equipment with significant health and safety implications – duplicator machine




In order to identify and plan the maintenance activities and schedule of equipment, it is necessary for the users and other concerned individuals or office to know the operation of each equipment or facility. The **Manual from the Manufacturers (Instruction Manual or User's Manual)** is usually accompanying the tool, equipment or facility, is essential in this aspect. Any office/institution may device the standard operating procedure in using such tool, equipment or facility. The production of procedural or instructional manual of equipment including the orientation or training in the operation, handling, storing, and disposal, is therefore necessary.

It is recommended that the operation of equipment should be developed based on the manufacturer's manual, basic and common knowledge of the equipment, and the established organizational policies, rules and regulations. The instruction on the operation must be posted or hung beside or near the equipment. Sample template is given below.

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| OPERATIONAL PROCEDURE | |
|--|---|
| Equipment Type | Desktop Computer |
| Equipment Code | Computer 1 |
| Location | Practical Work Area/Computer Laboratory |
| Operation Procedure: | |
| <ol style="list-style-type: none"> 1. Inspect the set up of the computer. Be sure that the area is dry and no spilt liquid nearby. 2. Check the stability of the computer and keyboard. 3. Check power cords and cables. Check connections. 4. Wipe dust and remove unnecessary objects that will obstruct the use of the computer. 5. Turn on AVR/UPS and then turn on the computer. 6. Use the computer properly. Avoid downloading from unrecognized/unsafe sites. 7. Before using external hard or flash discs, scan and clean. After using, be sure to close the document/program and eject it. 8. Properly shut down the computer when not in use. 9. Turn off the AVR/UPS after shutting down the computer. 10. Return the mouse and keyboard to their proper place after use. 11. To protect the desktop computer, cover it (if available). | |

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SELF-CHECK 5.1-1

Directions: Select the correct answer from the choices listed below each item. Write the letter of your choice in your answer sheet.


1. A competency-based workshop component that enables learning provision outside the training institution is _____.
 - A. Computer Laboratory
 - B. Distance Learning Area
 - C. Learning Resource Area
 - D. Support Service Area

2. This area provides the trainee with the knowledge requirements in the various modules responding to the competencies.
 - A. Computer Laboratory
 - B. Contextual Learning Area
 - C. Learning Resource Area
 - D. Trainers Resource Area

3. The area where the trainees acquire the skills and knowledge components of the competencies prescribe by the standard is _____.
 - A. Contextual Learning Area
 - B. Learning Resource Area
 - C. Trainers Resource Area
 - D. Practical Work Area


4. This area provides the mechanism of assessing the completion of competencies of a trainee.
 - A. Computer Laboratory Area
 - B. Institution Assessment Area
 - C. Quality Control Area
 - D. Support Service Area

5. This area ensures the application of underpinning knowledge, the science, mathematics and communication principles to the technology.
 - A. Contextual Learning Area
 - B. Learning Resource Area
 - C. Trainers Resource Area
 - D. Support Service Area

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ANSWER KEY 5.1-1

1. B
2. C
3. D
4. B
5. A

| | | | | |
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INFORMATION SHEET 5.1-2

Importance of Maintenance

Learning Objective: After reading this INFORMATION SHEET, you must be able to know, understand and appreciate maintenance and its importance.

Maintenance is an excellent means of improving the performance and condition of equipment and facilities. An effective maintenance program identified problems long before any equipment or facility breaks down or deteriorate. A good maintenance system presents the early discovery of problems, thus providing plenty of lead time for effective maintenance planning. The trainer has to value the importance of maintaining the training facilities, equipment and tools he is using or under his care if he values the presence and availability of these resources for effective training and learning processes.

The Growth of Interest in Maintenance

The factors contributing to the rapidly growing interest in maintenance are:

1. **Technological development**

This trend leads to a more mechanized and automated equipment, resulting in great productive potential which must be kept working. This means that training facilities are becoming more complicated and required more advanced maintenance.

2. **Increasingly expensive raw materials**


Finite raw materials, in combination with a growing population and increasing assumption, inevitably result in higher raw material prices. Unavoidably, the costs of all by-products must rise. It is therefore often more profitable to maintain existing equipment than purchase new ones.

3. **Greater complication**

A complicated facility of piece of equipment includes many components, any or all of which can constitute possible sources of trouble. Although the operational reliability of each individual component may be very high, it is necessary to multiply reliability factor of all components that are dependent on each other in a system in order to arrive at the total system reliability.

4. **Increased fixed costs**

Capital costs constitute a considerable part of the *total costs of training* and must be covered by the added value created. If

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training stops as a result of inadequate maintenance, capital costs (depreciation) must still be paid, so that the standstill results in a net loss. Still, the salaries and overhead expenses must be paid while training is stopped.

5. ***Reduce delayed activities and eradicate uncompleted work***

Many work processes depend on an uninterrupted flow of activities to produce desired result. If an activity is delayed, the entire work stops. If all the facilities and equipment are reliable working well, work delay can be reduced.

6. ***Environmental concern***

The growing quantity of *electronic wastes* (monitors, laptops, cellular phones, other electronic gadgets and its substances), the increasing use of chemicals such as cleaning agents, paints, fuel and its derivatives, the by-products created from its use, and its disposal, pose danger to the environment and all living things. *Mass awareness on waste management brings the relevance of conserving the natural resources and the products (machines, tools) thru proper maintenance to lengthen its useful life.*

Why Maintain?

General Objective:

- To keep the optimum condition of physical facilities at acceptable levels and minimum cost to satisfy the expected of programs, services and activities at acceptable and minimum costs


Specific Objectives:

- To *extend the useful life* of physical facilities
- To assure the *operational readiness* of installed equipment and maximum *possible return on investments*
- To properly *discard hazardous wastes*
- To ensure the *safety* of personnel using the facilities, physical properties and the environment



What can we gain from maintaining our facilities?

- Ensured SAFE environment
- Improved MORALE of human resources
- Reduced operational COST
- Increased PRODUCTION
- Prolonged LIFE of facilities
- Prompt DELIVERY of services/product

| | | | | |
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- WASTE/Garbage reduction

Who are involved?

- Who will manage the activities?
- Who will monitor and evaluate the operations?
- Who will prepare the maintenance schedule?
- Who will implement the program?
- Who will keep the records?
- Who will conduct inspection?
- Who will certify and accept the work?
- Who will prepare the report?

What, Where, When?

- What routine actions must be done to keep the device on working order?
- Where is the maintenance activity to be carried out?
- When do you perform the maintenance activities?

How to maintain?

The question on how do we implement the maintenance program will center on the **5Ms** are as follows:

- Manpower
- Money (Financial Resources)
- Methods and System
- Machines (Facilities)
- Materials and Supplies




A **maintenance program** is a comprehensive list of maintenance and its incidents. This would include all maintenance activities to be undertaken, manpower needed, maintenance methods to be used, all the materials and supplies needed and cost involved in the maintenance.

A **maintenance schedule** is a list allocating specific maintenance of an area, including equipment and tools to a specific period. The maintenance schedule is just a part of the maintenance program. A **maintenance checklist** is a list of maintenance tasks (preventive or predictive) typically derived through some form of analysis, generated automatically as work orders at a predetermined frequency.

The following templates are examples of inspection checklist for a comfort room (as a practical work area) in **Housekeeping NC II** (Sample Template #2,) and **GMAW NC III** (Sample Template #3)

Sample Template #2

| | | | | |
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| HOUSEKEEPING SCHEDULE | | | | | | | |
|---|---|-------------------------------------|-----------------|---------------|----------------------------|---------|---------|
| Qualification | GMAW NC III | Station/Bldg | | Welding (WAF) | | | |
| Area/Section | Practical Work Area | | | | | | |
| In-Charge | Lorenzo A. Ladia | | | | | | |
| ACTIVITIES | Responsible Person | Schedule for the 2nd Semester, 2011 | | | | | |
| | | Daily | Every other Day | Weekly | Every 15 th Day | Monthly | Remarks |
| 1. Clean and check welding equipment/ accessories from dust and oil; dry and properly laid-out/ secured/stable | Trainees/ Janitors (in the absence of trainees) | X | | | | | |
| 2. Clean and free welding booths and welding positioners from dust/rust /gums, used Mig wire stubs and metal scraps | Trainees/ Janitors (in the absence of trainees) | X | | | | | |
| 3. Clean and arrange working tables according to floor plan/lay-out; check stability | Trainees/ Janitors (in the absence of trainees) | | | X | | | |
| 4. Clean and check floor, walls, windows, ceilings <ul style="list-style-type: none">• graffiti/dust/rust• cobwebs and outdated/unnecessary objects/items• obstructions• any used materials/scraps (slugs, stubs) spilled liquid• open cracks (floor) | Trainees/ Janitors (in the absence of trainees) | | | X | | | |
| 5. Clean and check work shop ventilation and illumination by dusting lamps/bulbs, replacing non-functional lamps and keeping exhaust clean | Trainees/ Janitors (in the absence of trainees) | | | X | | | |
| 6. Clean and check computer set -monitor, CPU, keyboards, mouse – free, unnecessary markings, dust; cables and plugs are in order; well-arranged; all items functional | Trainees/ Janitors (in the absence of trainees) | | | X | | | |
| 7. Clean, inspect air conditioning equipment: <ul style="list-style-type: none">• keep screen and filter free from dust/rust• Check selector knobs if in normal positions and are functional• Check if drainage is OK | Trainees/ Janitors (in the absence of trainees) | | | | X | | |

| | | | | | | | |
|--|---|---|--|---|---|--|--|
| 8. Clean, check and maintain Tool Room <ul style="list-style-type: none"> Free of dust, not damp Tools in appropriate positions/locations With visible labels/signage Logbook and forms are complete, in order and updated Lights, ventilation – OK | Trainees/ Janitors (in the absence of trainees) | | | | X | | |
| 10. Clean and check Rest Room <ul style="list-style-type: none"> Urinals, bowls, wash basins, walls and partitions are free from stains, dirt, oils, graffiti and unnecessary objects; Ceilings free from cobwebs and dangling items Floor is kept dry; no broken tiles or protruding objects Equipped with dipper and pails; properly located after use Water systems is functional: no dripping/damaged faucets or pipes Drainage system is working, no water-clogged areas No offensive odor Lights /Ventilation – OK | Trainees/ Janitors (in the absence of trainees) | | | X | | | |
| 9. Clean and check wash area: <ul style="list-style-type: none"> Walls/Floors- –free from oils, molds, broken tiles, gums, stains or graffiti Drainage system is functional Water system functional; no dripping faucets or leaking pipes Free from unnecessary objects (mops, rags) | Trainees/ Janitors (in the absence of trainees) | | | X | | | |
| 10. Clean and maintain work shop surroundings by sweeping/ removing fallen leaves, branches, debris and other refuse, impounded water, clearing pathways of obstructions | Trainees/ Janitors (in the absence of trainees) | X | | | | | |
| 11. Disposal of waste materials (Follow waste segregation system) | Trainees/ Janitors (in the absence of trainees) | X | | | | | |

Sample Template #3

| GMAW WORKSHOP HOUSEKEEPING SCHEDULE | | |
|--|------------|-----------|
| DAILY TASK | YES | NO |
| Dispose segregated waste; clean garbage cans | | |
| Sweep floors; if wet, wipe dry | | |
| Wipe and clean whiteboards | | |
| Clean and arrange working tables | | |
| Clean and check mounting of machines/equipment | | |
| Before leaving, collect stubs and other welding wastes. | | |
| WEEKLY TASK | YES | NO |
| Clean posters, visual aids and update accomplishment/Progress Charts | | |
| Clean bulbs/lamps/ceilings/walls | | |
| Clean/Wash of windows/glasses/mirrors | | |
| Clean and check tools, machines, supplies, materials | | |
| Sanitize garbage receptacles | | |
| Empty water collector; clean body of Water Dispenser | | |
| MONTHLY TASK | YES | NO |
| Conduct inventory | | |
| Clean and arrange tool room | | |
| Inspect electrical system; clean cables, wires | | |
| Clean instructional materials & modules; arrange and put in order | | |
| Inspect and clean air-conditioning equipment filter; clean body | | |

To perform the maintenance of specific equipment, a maintenance schedule is drawn. Again, the best source of the list of the maintenance activities of equipment is its manufacturers/user's manual. In the absence of it, the plan can be derived from the known maintenance methods of the equipment and in accordance with the organization's policy and procedures. Following herein are maintenance schedules for welding equipment wherein the basis is the number of running hours (Sample Template #4) while another template (Sample Template #5) used the periodic or routinary schedule (daily, weekly).


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Sample Template #4

| WELDING EQUIPMENT MAINTENANCE SCHEDULE* | | |
|--|---|--|
| 8 HOURS <ul style="list-style-type: none"> Wipe up oil and fuel spills immediately Check fluid levels (oil and fuel) Service the air filter (refer to engine manual for specifics) Clean and tighten weld terminals | 50 Hours <ul style="list-style-type: none"> Check electrode oven heating elements Check equipment V-belts Note: Refer to Service Manual | 100 HOURS <ul style="list-style-type: none"> Change oil Change oil filter (refer to engine manual for specifics) Clean and tighten battery connections Clean aircon cooling system (refer to engine manual for specifics) Clean and check electrical panel board |

Sample Template #5

| EQUIPMENT MAINTENANCE SCHEDULE | | | | | | | |
|---|---------------------|--|------------------------|---------------|-----------------------|----------------|---|
| EQUIPMENT TYPE | | GMAW welding machine (MILLER) | | | | | |
| EQUIPMENT CODE | | GMAW-01 to 10 | | | | | |
| LOCATION | | PRACTICAL WORK AREA/WAF | | | | | |
| ACTIVITIES | MANPOWER | Schedule for the Month of March | | | | | Remarks |
| | | Daily | Every Other Day | Weekly | Every 15th Day | Monthly | |
| 1. Check panel board, and circuit breakers' electrical connections, cables and outlets <ul style="list-style-type: none"> Clean and kept dry Parts are well-secured/attached Properly labeled | Electrician Trainer | | | X | | | Activity is done before and after using the equipment |
| 2. Check Mig gun (nozzle, contact tip, diffuser) and ground cable: <ul style="list-style-type: none"> Clean and kept dry Parts are well-secured/ attached Inspect for damages and replace parts if necessary | Trainees Trainer | | | X | | | Activity is done before using the equipment |
| 3. Check adjustment lever's if functional (amperages/speed); if not, calibrate | Trainees Trainer | | | X | | | Activity is done before using the equipment |
| 4. Check Gas cylinder outfit for any abnormality <ul style="list-style-type: none"> Gate valve Co2 regulator Gas hose Fittings Fittings | Trainees Trainer | | | X | | | Activity is done before using the equipment |
| 5. Check/Clean wire feeder (rollers, wire speed/spool adjustment); remove used oil, dust; keep dry. | Trainees Trainer | | | | | X | |
| 6. Run the equipment for 5 minutes and observe for unusual noise or abnormal operation; if repair is necessary, send to technician. | | | | | | X | Check warranty and after service assistance from dealer |

| | | | | | |
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Along the **equipment maintenance schedule** is the **equipment maintenance inspection checklist**. The checklist will confirm if the maintenance activities have been performed in order to prolong the life of this particular equipment or workshop. The Inspection items are stated in a question form as these serve as the criteria or standards of maintenance. Sample Template #6 is inspection checklist for the workshop area of GMAW NC III while Sample Template #7 reflects a welding equipment inspection checklist.

Sample Template #6

| WORKSHOP INSPECTION CHECKLIST | | | |
|--------------------------------------|-----------|--|-----------------------------------|
| Qualification | | GMAW NC III | |
| Area/Section | | Practical Work Area | In-Charge Lorenzo Ladia |
| YES | NO | INSPECTION ITEMS | |
| | | 1. Are the welding equipment/ accessories clean from dust and oil? Dry and properly laid-out? Secured/stable? | |
| | | 2. Are the welding booths and welding positioners free from dust/rust/gums, Mig wire/stubs, metal scraps, graffiti, unnecessary mark/signage, stable, dry & odor-free? Area of machine can enable the trainee to move safely? | |
| | | 3. Are the working tables clean and dry? Arranged according to floor plan/layout? Stable? | |
| | | 4. Are floor, walls, ceilings, windows and doors clean, neat, without obstructions or unnecessary odor? All hinges and locks functional? With exit plans? | |
| | | 5. Is the workshop well-ventilated and with enough illumination? | |
| | | 6. Is the computer set clean and dry? Cables, plugs, mouse, properly laid out and functional? No cuts or splices in flexible wires? | |
| | | 7. Is the air conditioning equipment clean and functional? | |
| | | 8. Is the Tool Room free of dust, with legible and visible labels/signages, logbook and forms complete, in order & updated? Tools with safety guards and in appropriate positions/ locations? | |
| | | 9. Is the wash area clean, sanitized, free from unnecessary objects such as mops, rags? Are all water, drainage and electrical systems functional? | |
| | | 10. Is the rest room well-cleaned, dry and sanitized, no unacceptable odor and free from unnecessary objects such as mops, rags, outdated signage, dangling objects? Are the urinals, bowls, washbasins, walls and partitions free from stains, dirt, oils, graffiti and unnecessary objects? Is it equipped with adequate dipper and pails and properly located after use? Are all water, drainage and electrical systems functional? | |
| | | 11. Is the workshop surroundings clean and cleared of obstructions, no impounded water and with adequate lights? | |
| | | 12. Are there available receptacles for waste? Are the waste materials properly segregated and disposed? | |
| Remarks: | | | |
| Inspected by: | | Date: | |



Sample Template #7

| EQUIPMENT MAINTENANCE INSPECTION CHECKLIST | | |
|---|-----------|--|
| Equipment Type : Welding Machine (MILLER) | | |
| Property Code/Number : GMAW-01 | | |
| Location : PRACTICAL WORK AREA/WAF | | |
| YES | NO | INSPECTION ITEMS |
| | | 1. Are the panel board and circuit breakers' electrical connections, cables and outlets clean and dry? Parts are well-secured/attached, no cracks? Properly labeled? |
| | | 2. Are the Mig guns (nozzle, contact tip, diffuser) and ground cables, clean and dry? Parts are well-secured/attached? In good condition? |
| | | 3. Are the adjustment lever's amperages/speed,) functional? |
| | | 4. Are the gas cylinder outfits (gate valve, Co2 regulator, gas hose fittings, cleaned and in good condition? No leaks? |
| | | 5. Are the wire feeder (rollers, wire speed adjustment, wire spool) free from dust, rust, oil? Dry? |
| | | 6. Is the equipment mounted properly? |
| | | 7. Is the equipment in A1 condition?? If not, was a report prepared and submitted to authorized personnel? |
| Remarks: | | |
| Inspected by: | | Date: |

Technical Support Services

The maintenance of facilities is manned by the different specialist or group of specialists. Frequently, a matrix organization is established which can be seen in Diagram No. 1.

Functional Chart of Technical Support Services

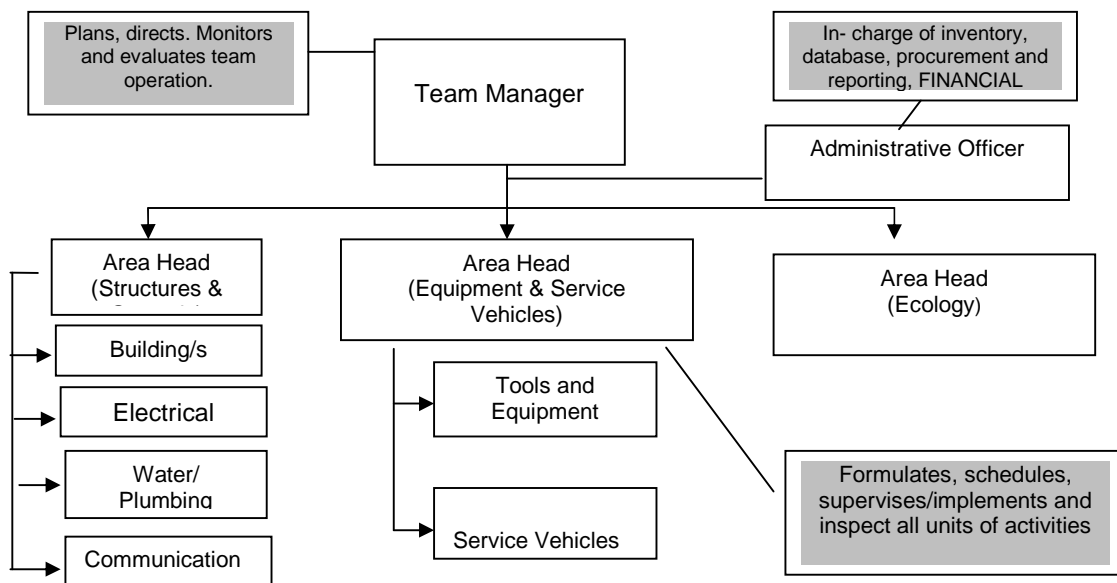



Diagram No. 1


| | | | |
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SELF-CHECK 5.1-2

MULTIPLE CHOICE

Directions: Choose the best answer for each number by indicating in your answer sheet the letter of your choice:


- What is the most important reason why we maintain our facilities?
 - Assure readiness of installed equipment
 - Extend the useful or service life of facilities
 - Improve morale of human resources
 - Properly discard hazardous wastes
- It is a comprehensive list of maintenance and its incidence.
 - Housekeeping Maintenance
 - Maintenance Checklist
 - Maintenance Program
 - Maintenance Schedule
- The best reference for the proper use and maintenance of an equipment is the _____.
 - Inspection Checklist
 - Maintenance Program
 - Maintenance Schedule
 - Manufacturer's Manuals
- The 5Ms in the maintenance program are _____.
 - Manpower, management, machines, methods and money
 - Manpower, management, materials, machines and money
 - Manpower, materials, methods, machines and money
 - Manpower, materials, methods, maintenance and money

| | | | | |
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ANSWER KEY 5.1-2

MULTIPLE CHOICE

1. A
2. C
3. D
4. D

| | | | | |
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INFORMATION SHEET 5.1-3

Maintenance Methods and Systems

Learning Objective: After reading this INFORMATION SHEET, you must be able to know and understand the different methods, systems and techniques as applied in the maintenance of facilities.

There are different methods, systems and techniques being applied in the maintenance of training facilities and equipment such as the *Reliability Centered Maintenance (RCM)*, *Predictive Maintenance (PdM)*, *Preventive Maintenance (PM)*, and *Total Production Maintenance*. The most popular are the *Quality Management System* and the *5S of Housekeeping*. Of late, the installation of software or computer-based system is helpful.

Quality Management System

Quality management is a method for ensuring that all the activities necessary to design, develop and implement a product or service are effective with respect to the system and its performance. Quality management can be considered to have 3 main components - *quality control*, *quality assurance* and *quality improvement*. Quality management focuses not only on product/service quality but also the means to achieve it. Quality management therefore uses quality assurance and control of processes as well as products to achieve more consistent quality.

The following diagram is the **Shewhart cycle (PDCA)** for quality improvements (Made popular by Dr. Deming) [www. quality-management-system.com](http://www.quality-management-system.com)

The Quality Management Cycle

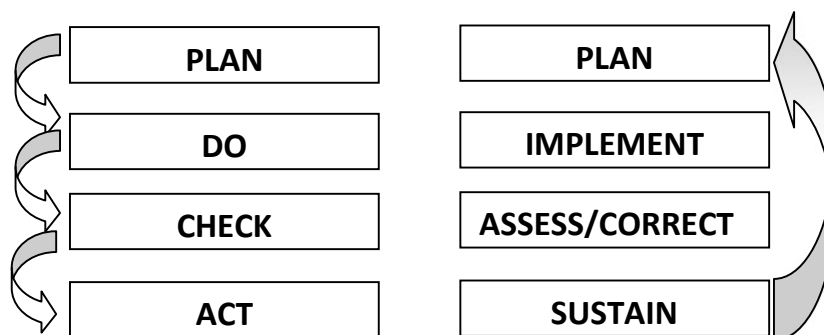



Diagram No. 2

| | | | |
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1. **Plan.** In this stage an organization must be able to prepare a good maintenance program which will define the standards for Best Management Practices. The maintenance program must clearly answer the question on WHY, WHO, WHAT, WHEN, WHERE and HOW.
2. **Do.** Here, the organization through the clearly identified maintenance program, must be able to practice the Methods and System defined in order to meet the standards (measurable performance levels of maintenance execution) established.
3. **Check.** To determine if the maintenance program is implemented according to what is planned, an assessment must be done. The result of the assessment will then be recorded and recorded to the proper authorities for the immediate action. Regular inspections are conducted to assure that the maintenance activities are done on the date and time it was planned and that the performance levels adhered to the defined standard.
4. **Act.** Inspection will allow the organization to determine if the standards of maintenance are met. This will also allow the identification of further improvement in the process and procedures. Hence, the results of the inspection must be properly documented and reported to the proper authorities for immediate action or correction needed.




The 5S Housekeeping Systems

5S is the name of a workplace organization methodology that uses a list of five Japanese words which are *seiri*, *seiton*, *seiso*, *seiketsu* and *shitsuke*. Transliterated or translated into English, they all start with the letter "S". It is synonymous with standardized clean up. The list describes how items are stored and how the new order is maintained. The decision-making process usually comes from a dialogue about standardization which builds a clear understanding among employees of how work should be done. It also instills ownership of the process in each employee. www.training-management.info/5s.htm

Seiri (Sort)

- TIDINESS, ORGANIZATION
- Taking out and disposing of unnecessary items.
- Unneeded items are thrown away or disposed.
- Refers to the practice of sorting and through all the tools, materials, etc., in the work area and keeping only essential items.

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Everything else stored or discarded. This leads to fewer hazards and less clutter to interfere with productive work.

Note: Things that clutter the workplace that are not needed should be taken out. They usually occupy space and restrict physical movement.

Seiton (Systematize)

- **ORDERLINESS:** *Tools, equipment, and materials must be systematically arranged for the easiest and most efficient access.*
- Arrangement/Organization of necessary items in good order
- Assign a place for everything. The most often used item should be nearest and ergonomically situated, meaning – there should be little effort required in accessing, using and returning the equipment, tools and parts, even documents. There must be a place for everything, and everything must be in place.

Seiso (Sweep)

- **CLEANLINESS:** *Cleaning even if things are NOT DIRTY.* A regular cleaning schedule prevents things from getting too dirty that it would be difficult to making it clean and span.
- Indicates the need to keep the work place clean as well as neat. Cleaning in Japanese companies is a daily activity. At the end of each shift, the work area is cleaned up and everything restored to its place.




Seiketsu ((Standardize)

- **STANDARDS:** *Maintaining the workplace in high standard housekeeping.*
- Allows for control and consistency. Basic housekeeping standard apply everywhere in the facility. Everyone knows exactly what his or her responsibilities are. Housekeeping duties are part of regular work routines.
- Prepare Housekeeping Standard Checklist. Checklist should be *very detailed and stringent*. Remember that thoroughness is a requirement of EXCELLENCE.
- **EVALUATE** workstation according to the Housekeeping Standard Checklist.
- **IMPLEMENT** a periodic clean-up schedule; and an award and sanction scheme.

Tips in Preparing a Housekeeping Standard Checklist:

- Keep it simple – one page checklist
- Follow a logical sequence

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- Use bullet enumerated points, if relevant and necessary
- Consider the **5WH**
- Avoid making assumptions
- From each item in your checklist, other items will naturally originate from it.



Note: Some samples of housekeeping and equipment standard checklist were presented in previous topics.

Shitsuke (Self-discipline)

- **SUSTAINING DISCIPLINE:** *Doing things spontaneously without having to be told.*
- “Teach by doing”
- It is good discipline to leave the workplace cleaner than when it is found.
- Refers to maintaining standards and keeping the facility in safe and efficient order day after day, year after year.

Safety, as defined may be the freedom from danger injury or damage, as well as security, are integral parts of the housekeeping system.

Safety Precaution


These are general safety precaution concerning people and facilities although these may vary depending on the trade which they are in.

Concerning People

- When working wear appropriate clothing.
- Make sure that the safety hat is worn properly.
- Do not wear gloves when operating equipment except when any part thereof is hot.
- Never remove safety devices or safety cover from equipment.
- Be careful of high voltages. Never touch switches with wet hands.
- When repairing power lines turn off the main power supply first.
- Should an accident occur, it should be reported immediately to proper authority no matter how trivia.

Concerning Facilities

- Facilities must be adequately illuminated, clear, neat and dry.
- Keep the area organized so there are no obstacles lying around the floor.
- The equipment and the floor area round the equipment must be free from dust and any chipping.

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- Workbenches must be strong and sturdy, and their surfaces treated with non-skid materials.

Security Policies and Procedures

The word **security** in the general usage is synonymous with “safety” but as technical term “security” means that something not only is secure but that it has been secured. Part of a good housekeeping program is the stress on security in the work area and of the tools and equipment. Here are some security policies and procedures that we may apply in the workplace:

Physical Property

Keep your premises physically secure. Always ensure you know who in the building. Prevent visitors casually wandering into your premises. If appropriate, fit an alarm, lock valuable asset (e.g. laptops, mobiles and the servers) in a secure room. Try to keep items out of direct public view.

Education

Let everyone know what is expected of them. Make sure they know the value of the information they handle and are aware of any procedures you have developed to combat threats. Make sure people know what their responsibilities are.

Access Control

If you run a multi-user computer system, use the appropriate access control software to keep unauthorized persons away from information held on your computer systems. Make sure everyone who needs access has their own ID and password and ensure they can only access what they need in order to do their job.




multi-user computer appropriate access keep unauthorized information held on your Make sure everyone who their own ID and ensure they can only

Clear Desks

Establish a practice of clearing desks at the end of each day. This need not be a complex process simply ensure that staff have lockable drawers or cupboards in which to place their work, and make sure these are locked and the keys removed.

Destruction

If you have sensitive information which you wouldn't want to fall into the wrong hands, destroy any copies you don't need. , if you have a lot of paper copies, modern shredders provide an inexpensive and effective solution. Some organizations use specialists destruction companies; this is normally only necessary if you have a lot of highly sensitive material.

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Total Productive Maintenance

The **Total Productive Maintenance** (TPM) system is the systematic analysis, planning, control and application of work and materials in economic amounts by competent personnel to ensure orderly and continuous functioning of all productive resources.

Total productive maintenance main objective is to keep and improve production facilities stable and efficient at the lowest life cycle cost with the active participation of all members in the organization. Specifically, its purposes are:

- To increase productivity through maximum utilization and improvement of all available equipment
- To develop maintenance system to reduce life cycle cost of machinery and equipment through the involvement of everybody in the organization.
- To develop operator's capability to be competent in maintenance activities through education, training and motivation.
- To enhance capability for advanced and sophisticated technology that would reinforce competitive power

Conditions for Maintenance Control


Basic Policy of Maintenance Control

- Efficient operation of equipment
- Enhancement of maintenance technology
- Develop equipment to achieve stable operation
- Assignment of job responsibilities for each work level
- Technical training to upgrade the quality of workers, etc.



Basic Elements for Actual Maintenance Control

- Organization
- Standard Maintenance and inspection procedure
- Work Order System
- Work scheduling procedure
- Material control
- Maintenance record system
- Maintenance performance measuring system
- Power to implement all of the above

| | | | | |
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TPM balances maintenance cost and efficiency so that all equipment and facilities can operate at full capacity with the least possible cost. It aims to improve an organization through the attitude and skill of all personnel from the top management down to the operations level in various maintenance undertakings.


Improved equipment effectiveness not only drives home the 5S of maintenance but also eradicates the six big losses in equipment. *TPM produces system effectiveness or overall equipment effectiveness through combination of availability, efficiency, and the proportion of quality products processed.* To maximize the effectiveness of this man machine system, the six “big losses” listed that interfere with its effective operation must be eliminated:

1. *Equipment failure* – downtime losses caused by unexpected breakdowns
2. *Set-up and adjustment* – downtime losses from set-up times and adjustment such as exchanging dies in press and injection machine
3. *Idling and minor stoppages* – losses resulting from idling and minor stoppages caused by the operation of sensors and blockages of work on chutes
4. *Reduced speed* – losses caused by the discrepancy between the design speed and actual speed of equipment
5. *Defects in process* – losses caused by defects and reworking of defects
6. *Reduced yield* – losses that occur between start-up and steady production

Tag-out System

Tagging-out is a system to **warn** or let you know whether something in your workplace should either be operated with extra care or left alone. Tags and labels help ensure the safety of trainees/trainers/staff and prevent improper operation of equipment.

Tagging-out consists of *placing labels or hanging tags* on equipment or a part of big equipment. This gives information on the status or abnormal condition of the equipment or special instruction in its operation. The note/s on the tag or label, color (red- for danger, yellow for caution), size, make-up, and the policies and procedures for enforcement may vary from one organization to another. The tag-out activity should be logged.

| | | | | |
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Purposes of Equipment Tag-out Bill

1. To provide a procedure to prevent the improper operation of a component, piece of equipment a system, or portion of a system that is isolated or in an abnormal condition.
2. To provide a procedure in operating an instrument that is unreliable or not in normal operation condition.
3. To provide separate procedures for trainees/trainers/staff when accomplishing certain planned maintenance (PMS) actions.



Tag-out Documents

- Tag out Logs
- Caution Tags
- Danger Tags




- Out of – Calibration Labels
- Out of – Commission Labels




As a good practice and for better maintenance control, document/record tagging-out activity as well as inspection and audit conducted. Following is a sample template # 6 for reference.

| | |
|-------------------------------|------|
| OUT OF CALIBRATION | |
| SERIAL NO. | DATE |
| AUTHORIZED BY/ CONCURRENCE BY | |
| TAG BY | TIME |
| ERROR | |

| | | | |
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Sample Template #8

| DANGER/CAUTION TAG-OUT INDEX AND RECORD AUDITS | | | | |
|---|--------------------|----------------------------------|--|-----------------------|
| LOG SERIAL | DATE ISSUED | TYPE (Danger/Caution) | DESCRIPTION (System Components, Test Reference, etc.) | DATE COMPLETED |
| 2011-005 | November 2011 | Danger/Out of order | Vertical Milling Machine (Microcut) | December 2011 |
| 2011-006 | December 2011 | Out of Calibration | Grinding Machine | December 2011 |
| 2011-007 | December 2011 | Caution/Cable with cuts | Welding Machine | January 2012 |

| | | | | |
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SELF-CHECK 5.1-3

MULTIPLE CHOICE

Directions: Select the best answer for each number by writing the letter of your choice in your answer sheet.

1. The PDCA Cycle was popularized by _____.
 A. Deming
 B. Eliot
 C. Herzberg
 D. Ishikawa


2. To keep improving the quality of an organization, the Do stage of PDCA, means _____.
 A. Assessing the reports
 B. Deciding on changes to improve the process
 C. Designing the process
 D. Measuring performance

3. To keep improving the processes of an organization, the **Act** stage of PDCA means _____.
 A. Assessing the reports
 B. Deciding on changes to improve the process
 C. Designing the process
 D. Measuring performance


4. In 5S, arranging or organizing necessary items in good order is _____.
 A. Seiri/Sorting
 B. Seiton/Systematizing
 C. Seiso/Sweeping
 D. Seiketsu/Standardizing

5. The taking out and disposing of unnecessary items in 5S is _____.
 A. Seiri/Sorting
 B. Seiton/Systematizing
 C. Seiso/Sweeping
 D. Seiketsu/Standardizing

6. Maintaining the workplace in high standard housekeeping is _____.
 A. Seiri/Sort
 B. Seiton/Systematize
 C. Seiso/Sweep
 D. Seiketsu/Standardize

| | | | | |
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7. Keeping the workplace clean as well as neat.
 - A. Seiri/Sort
 - B. Seiton/Systematize
 - C. Seiso/Sweep
 - D. Seiketsu/Standardize
8. The best tip in preparing a checklist is _____.
 - A. Keep it long
 - B. Keep it short
 - C. Keep it simple
 - D. Keep it complex
9. The Total Productive Maintenance main objective is to _____.
 - A. Keep and improve production facilities stable and efficient at the lowest life cycle cost with the active participation of most members in the company.
 - B. Keep and improve production facilities stable and efficient at the normal life cycle cost with the active participation of all members in the company.
 - C. Maintain efficiency and stability of facilities at the lowest life cycle cost with the active participation of all key officials in the organization or company.
 - D. Maintain efficiency and stability of facilities at the lowest life cycle cost with the active participation of all members in the company.
10. According to TPM, to maximize the effectiveness of this man machine system, there are _____ “big losses” that facilitates effective operation.
 - A. 4
 - B. 5
 - C. 6
 - D. 7

| | | | |
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ANSWER KEY 5.1-3

MULTIPLE CHOICE

1. A
2. D
3. B
4. B
5. A
6. D
7. C
8. C
9. D
10. C

| | | | | |
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TASK SHEET 5.1-3a

Learning Outcome : Plan Maintenance Activities

Task : Prepare a Housekeeping Schedule

Learning Objective: After reading Information Sheets 5.1-1 to 5.1-3, you must be able to prepare a Housekeeping Schedule for chosen area/areas in your respective Qualification using Blank Template #1.


Time Allotment: 30 minutes

Materials and equipment needed:

- Blank Template #1
- TR/CBC
- Inventory of Tools and Equipment
- Laptop/PC
- Pencil/Pen
- Bond Paper
- Manual of Procedures
- Schedule of Activities of the School/Center
- Calendar
- Organization/School Policy/Regulations on Maintenance Program

Procedure:


1. Prepare all your reference materials and laptop/PC.
2. Identify the area or location you have chosen. A layout of the area shall be useful as reference.
3. Fill up all items in Blank Template #1. Remember to provide the necessary housekeeping activities.
4. Tick the box corresponding to each given inspection area.
5. Call your facilitator who will guide you and check your work after doing this activity.

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| HOUSEKEEPING SCHEDULE | | | | | | | |
|------------------------------|---------------------------|--|------------------------|---------------|-----------------------|----------------|----------------|
| Qualification | | | | | | | |
| Area/Section | | | | | | | |
| In-Charge | | | | | | | |
| ACTIVITIES | Responsible Person | Schedule for the Month of _____ | | | | | |
| | | Daily | Every other Day | Weekly | Every 15th Day | Monthly | Remarks |
| | | | | | | | |
| | | | | | | | |
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To be included:

- Training equipment
- LCD projector
- Projector screen
- Audio visual
- Computer set
- Air conditioning
- Water dispenser
- Support equipment
- Fax machine/telephone
- Photocopier

| | | | | |
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PERFORMANCE CRITERIA CHECKLIST 5.1-3a

| CRITERIA | YES | NO |
|---|-----|----|
| Did the trainer-trainee prepare the needed materials/equipment for the task? | | |
| Did the trainee choose an area in his qualification/trade area? | | |
| Was the housekeeping activity appropriate to the area/facility considering the size/structure/requirement of the equipment (and amenities, if there are)? | | |
| Were the assigned person/s capable or authorized in performing such activity based on the organizational policy/procedure? | | |
| Were the costs of housekeeping materials (i.e. cleaning agents, handy vacuum, etc.) considered in the maintenance activities? | | |
| Was the presence or availability of the housekeeping equipment, tools and materials considered in the preparation of the schedule? | | |
| Was the cost of housekeeping activities considered in the preparation of the schedule? | | |
| Were the housekeeping activities and schedule applicable to the area/facility? | | |
| Was the task sheet accomplished/done within the required time limit? | | |

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TASK SHEET 5.1-3b

Module Title : Maintaining Training Facilities

Learning Outcome : Plan Maintenance Activities

Task : Prepare an Equipment Maintenance Schedule

Learning Objective: After reading Information Sheets 5.1-1 to 5.1-3, you must be able to prepare EQUIPMENT MAINTENANCE SCHEDULE for the particular equipment in your workplace using the Blank Template #2.


Time Allotment: 20 minutes

Materials and equipment needed:

- Blank Template #2
- TR/CBC
- Inventory of Tools and Equipment
- Laptop/PC
- Manufacturer's Manual
- Organization/School Policy/Regulations on Maintenance Program

Procedure:


1. Prepare all your reference materials and laptop/PC.
2. Identify only one type of equipment from the Inventory of Tools and Equipment.
3. Fill up all items in Blank Template #2.
4. Tick the schedule corresponding to each given activity.
5. Call your facilitator who will guide you and check your work after doing this activity.

| | | | | |
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| EQUIPMENT MAINTENANCE SCHEDULE | | | | | | | |
|--------------------------------|----------|---------------------------------|-----------------|--------|----------------|---------|---------|
| EQUIPMENT TYPE | | | | | | | |
| EQUIPMENT CODE | | | | | | | |
| LOCATION | | | | | | | |
| ACTIVITIES | MANPOWER | Schedule for the Month of _____ | | | | | |
| | | Daily | Every Other Day | Weekly | Every 15th Day | Monthly | Remarks |
| | | | | | | | |
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| | | | | | | | |
| Special Instructions: | | | | | | | |
| Trainer: | | | | | | | |

PERFORMANCE CRITERIA CHECKLIST 5.1-3b

| CRITERIA | YES | NO |
|---|-----|----|
| Did the trainee prepare the needed tools and equipment for the task? | | |
| Did the trainee identify and choose the equipment from among the list/inventory in his area/Qualification? | | |
| Was the Manufacturer's Manual used as basis in the schedule and maintenance activities of the equipment? | | |
| Were the costs of housekeeping materials (i.e. cleaning agents, handy vacuum, etc.) considered in the maintenance activities? | | |
| Was safety and frequency of used considered in the equipment maintenance schedule? | | |
| Was the person assigned as indicated in the schedule capable or authorized to perform the maintenance activities? | | |
| Are the maintenance activities in accordance with the organizational/school policy/regulations? | | |
| Was the task sheet accomplished/done within the required time limit? | | |

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TASK SHEET 5.1-3c

Module Title : Maintaining Training Facilities

Learning Outcome : Plan Maintenance Activities

Task : Prepare Housekeeping Inspection Checklist

Learning Objective: After reading Information Sheets 5.1-1 to 5.1-3, you must be able to prepare an Inspection Checklist on the same area chosen in Task Sheet 5.1-1.


Time Allotment: 30 minutes

Materials and equipment needed:

- Blank Template #3
- TR/CBC
- Inventory of Tools and Equipment
- Laptop/PC
- Schedule of Activities of the School/Center
- Organization/School Policy/Regulations on Maintenance Program

Procedure:

1. Prepare all your reference materials and laptop/PC
2. Identify the same area you have chosen in Task Sheet 5.1-3a.
3. Identify and determine the items to be indicated in the Inspection Items of the blank template.
4. Complete the details of Blank Template #3. Remember that checklist must be simple but detailed or tedious.
5. Call your facilitator who will guide you and check your work after doing this activity.


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HOUSEKEEPING INSPECTION CHECKLIST

| HOUSEKEEPING INSPECTION CHECKLIST | | |
|-----------------------------------|----|------------------|
| Qualification | | |
| Area/Section | | |
| In-Charge | | |
| YES | NO | INSPECTION ITEMS |
| | | |
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| | | |
| Remarks: | | |
| Inspected by: | | Date: |

PERFORMANCE CRITERIA CHECKLIST 5.1-3c

| CRITERIA | YES | NO |
|--|-----|----|
| Did the trainee prepare the needed tools, equipment and other materials for the task? | | |
| Did the trainee base the checklist on the accomplished maintenance schedule of Task Sheet 5.1-3a? | | |
| Was the Manufacturer's Manual use as basis in the schedule and maintenance activities of the identified equipment? | | |
| Was the availability and specification (i.e. quantity) of housekeeping materials considered in the maintenance of the equipment? | | |
| Were the costs of maintenance/housekeeping materials (i.e. cleaning agents, handy vacuum, etc.) considered in the facility inspection checklist? | | |
| Was safety and frequency of use of materials such as cleaning agents, considered in the equipment inspection checklist? | | |
| Was the person assigned as inspector capable, or has adequate knowledge in equipment maintenance? | | |
| Are the maintenance activities in accordance with the organizational/school policy/regulations? | | |

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TASK SHEET 5.1-3d

Module Title : Maintaining Training Facilities

Learning Outcome : Plan Maintenance Activities

Task : Prepare Equipment Maintenance Inspection Checklist

Learning Objective: After reading Information Sheets 5.1-1 to 5.1-3, you must be able to prepare an Inspection Checklist on the same equipment you have chosen in Task Sheet 5.1-2.


Time Allotment: 20 minutes

Materials and equipment needed:

- Blank Template # 4
- TR/CBC
- Inventory of Tools and Equipment
- Laptop/PC
- Schedule of Activities of the School/Center
- Organization/School Policy/Regulations on Maintenance Program

Procedure:

1. Prepare all your reference materials and laptop/PC
2. Identify the same equipment you have chosen in Task Sheet 5.1-3b.
3. Fill up all items in Blank Template #4.
4. Tick the box corresponding to each given inspection items.
5. Call your facilitator who will guide you and check your work after doing this activity.

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EQUIPMENT MAINTENANCE INSPECTION CHECKLIST


Equipment Type : _____
Property Code/Number : _____
Location : _____
Trainer-In-Charge : _____

| YES | NO | INSPECTION ITEMS |
|-----|----|------------------|
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Remarks:


Inspected by:

Date:

| | | | | |
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PERFORMANCE CRITERIA CHECKLIST 5.1-3d

| CRITERIA | YES | NO |
|--|-----|----|
| Did the trainee prepare the needed tools, equipment and other materials for the task? | | |
| Did the trainee base the checklist on the accomplished maintenance schedule of equipment indicated in Task Sheet 5.1-3b? | | |
| Was the Manufacturer's Manual use as basis in the schedule and maintenance activities of the identified equipment? | | |
| Were the costs of maintenance/housekeeping materials (i.e. cleaning agents, handy vacuum, etc.) considered in the facility inspection checklist? | | |
| Was safety and frequency of use of materials such as cleaning agent s, considered in the equipment inspection checklist? | | |
| Was the availability and specification of testing materials (if necessary), considered in the maintenance of the equipment? | | |
| Was the person assigned as inspector capable, or has adequate knowledge in equipment maintenance? | | |
| Are the maintenance activities in accordance with the organizational/school policy/regulations? | | |
| Was the task sheet accomplished/done within the required time limit? | | |

| | | | |
|--|--|--|---------------|
| LEARNING OUTCOME 2 | | IMPLEMENT HOUSEKEEPING ACTIVITIES | |
| CONTENTS: <ul style="list-style-type: none">Occupational Health and SafetyWaste Management | | | |
| ASSESSMENT CRITERIA: <ol style="list-style-type: none">Regular inspections are carried out in the work area according to workplace procedures and standards.Facilities are maintained in accordance with Occupational Health and Safety.Disposal of waste and dangerous chemicals is checked in accordance Occupational Health and Safety regulations and organizational policies and other regulations.Instructional materials and equipment are secured in safe place in accordance with procedures. | | | |
| CONDITIONS: <p>Trainees must be provided with the following:</p> <ul style="list-style-type: none">Training Resources<ul style="list-style-type: none">References (books)Audio/Video materialsModules/ManualsToolsMaterials/ConsumablesTraining Facilities/Area<ul style="list-style-type: none">Work stationsEquipment/MachinesFurniture/FixturesInstructional equipment | | | |
| METHODOLOGIES: <ul style="list-style-type: none">Group discussionSimulationLectureSelf-learning instruction | | | |
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ASSESSMENT METHODS:

- Written Test
- Portfolio
- Demonstration/Questioning

| | | | | |
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LEARNING EXPERIENCES

Learning Outcome 2

IMPLEMENT HOUSEKEEPING ACTIVITIES

| Learning Activities | Special Instructions |
|---|---|
| Read Information Sheet 5.2-1 on Occupational Health and Safety | <p>In comparing your answers from the model answer, be sure that all your answers are correct before proceeding to the next activity.</p> <p>In performing the task sheets, compare your output with the sample template provided in the Information Sheet/s. Assess/Evaluate your work according to the performance criteria checklist. Make the necessary corrections or improvements. Secure the evaluation of your trainer and let him record your accomplishment/s.</p> <p>If all the learning activities are undertaken, proceed to the next Learning Outcome on Maintain Training Equipment and Tools.</p> <p>For additional information, refer to DOLE Occupational Health and Safety Standards (OHSSAD) Manual, RA 9003 and RA 8749.</p> <p><i>Note: Full text of RA 9003 and RA 8749 are attached in the module.</i></p> |
| Answer the self-check. Compare with the model answer. | |
| Read Information Sheet No. 5.2-2 on Waste Management | |
| Answer the self-check. Compare with the model answer. | |
| Perform Task Sheet 5.2-2 on Prepare a Waste Segregation List | |

INFORMATION SHEET 5.2-1

Occupational Health and Safety

Learning Objectives: After reading this INFORMATION SHEET, you must be able to know and understand the importance of occupational health and safety in your workplace or training area.

Occupational Health and Safety (OHS) is a cross-disciplinary area concerned with protecting the safety, health and welfare of people engaged in work or employment. Knowing OHS is essential to minimize the hazards and risks not only to students, trainers and other people within the training institution but others who will be affected.

Occupational Health and Safety (OHS)

The goal of all occupational safety and health programs is to foster a **safe work environment**. As a secondary effect, OHS may also protect co-workers, family members, employers, customers, supplies, nearby communities, and other members of the public who are impacted by the workplace environment (*DOLE Occupational Health and Safety Standards (OHSSAD) Manual*).


“Occupational **health**” as stated in Wikipedia, aims at:

1. The promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations;
2. The prevention among workers of departures from health caused by their working conditions;
3. The protection of workers in their employment from risks resulting from factors adverse to health;
4. The placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological capabilities; and
5. The adaptation of work to man and each man to his job.



Reasons for occupational safety and health standards are:

- **Moral** – An employee should not have to risk injury at work, nor should others associated with the work environment.
- **Economic** – Many governments realize that poor occupational safety and health performance results in cost to state (e.g. through social security payments to the incapacitated, cost for medical treatment, and the loss of “employability” of the worker).

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Employing organizations also sustain costs in the event of an incident at work (such as legal fees, fines, compensatory damages, investigation times, lost production, lost goodwill from the workforce, from customers and from the wider community).

- **Legal** – Occupational safety and health requirements maybe reinforced in civil law and/or criminal law, it is accepted that without the “encouragement” of potential regulatory action or litigation, many organizations would not act upon their implied moral obligations.

Objective of the OHS Standard

The objective of OHS standard is to protect working man against the dangers of injury, sickness or death through safe and healthful working conditions, thereby assuring the conservation of valuable manpower resources and the prevention of loss or damage to lives and properties.

OHS in Relation to Waste Management and Disposal of Dangerous Chemicals


Infectious waste can be divided into three primary groups such as:

1. **Liquid waste** – blood, other bodily fluids or culture media which is known or suspected to be contaminated with a disease agent.
2. **Soft materials** – dressings, bandages, beddings, toweling etc. that are saturated to the point that they are capable of releasing blood, body fluids or other potentially infectious materials when handled and compressed.
3. Any object commonly referred to as **sharp**, that has been contaminated with blood, body fluids or other infectious agent which could penetrate the skin or could do so if broken. Examples: broken glass, pipettes (glass and hard plastic), scalpel blades and lancets.



Liquid or special waste – Determination and disposal are coordinated with the Department of Environment and Department of Health and in accordance with local, state and federal regulations. Liquid or special wastes include but are not limited to:

- Bactericidal or sanitizing solutions
- Concrete and asphalt sealants
- Degreasing agents
- Floor sealers, waxes and strippers
- Heating or air – conditioning treatment solutions

| | | | | |
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- Lubrication oils
- Paints, latex and oil- based
- Related paint products thinners, solvent and strippers
- Pesticide or herbicide products
- Sludge wastes, including cooling tower sludge
- Vehicles maintenance fluids
- Water treatment solutions

Radioactive Waste – Determination and disposal are coordinated by the authorized agency in accordance with local and national regulations. Radioactive waste includes, but is not limited to:

- General laboratory refuse (e.g., glassware, paper, etc.) that is contaminated with radioactive materials.
- Liquid wastes which includes a radioactive material component, and
- The remains of animals that contain radioactive materials as a result of administration of such material for research.



Radioactive waste is required to be *labeled* in accordance with procedures established by the radiation safety office and typically exhibits the universal radiation precaution symbol for radiation.

Hazardous or Chemical Waste – Determination and disposal are coordinated with the Department of Environment and Natural Resources in accordance with local, state and federal regulations. Hazardous or chemical waste includes but is not limited to any stock chemical or chemical reagent that may inhibit one or more of the following physical hazards.


Corrosivity – The material has a pH, whether acidic or basic, that will corrode steel or injure human tissue. This includes materials with a pH less than 5 or greater than 10, regardless of strength of the acid or base.

Ignitibility – The material presents a significant fire hazard at room temperature.

Reactivity – The material reacts violently with water, forms potentially explosive mixtures with water, generates toxic gases, vapors or fumes when mixed with waste, or is unstable and can undergo a violent physical change.



Toxicity –The materials exhibit a significant characteristic or toxicity to human health or the environment.

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GOOD OHS PRACTICE

Disaster Plan

There should be plan in place to deal with any emergency. The nature of emergency can vary from fire and chemical spills, and all the obvious hazards that these present, to power and water failures that can lead to unsafe working conditions.

Training and Providing Relevant Information

Awareness of the problems and positive approach to prevention is the key to good OH&S practice. Many accidents and injuries can be avoided by providing staff with appropriate training. Up to date information regarding safe work practices, equipment safety and chemical information should be readily available in the workplace. Much of this information is available as poster and charts. The benefits of this can be seen in staff morale, productivity and the quality of work. Other benefits can be seen in terms of reduced in



insurance premium, compensations and rehabilitation claims.

Work and Storage areas

With the safety of material in mind, *work and storage areas should be designed, constructed, and equipped to ensure that there is minimum risk to archive material or staff.* Work and storage areas must be kept free of food and drinks, harmful contaminants, pollutants or vermin and harmful radiation.


Exits, passageway, stairs and equipment access areas should be kept clear of obstruction; including stored materials or materials and equipment in use. Obstruction can be potential hazard.



Near Miss and Hazardous Incidents and Accident Investigation

Near misses and hazardous incidents are those in which no one gets hurt and where no material or equipment is damage, but have the potential to cause damage or harm. Step should be taken to eliminate causes as soon as possible, and while rectifying initial problem ensures that it does not create a danger to anyone else. Regular safety inspections of a workplace can help to ensure that wherever possible accidents are prevented from occurring. It is very useful to develop a safety checklist that is appropriate to the workplace.

Supervisors should be trained to understand and recognize the occupational health and safety risk and needs in the area they are responsible for. This will enable them to fulfill their duty in regard to accidents are work related accidents which results in serious injury.

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Report of Notifiable Accidents, Incidents and Dangerous Occurrences

Records of reports and witness statements of notifiable accidents, incidents and dangerous occurrences will need to be preserved in the event of future claims or litigation. There are also valuable in identifying hazard and improvements that may still be needed to prevent further accidents.

First Aid

First Aid Officers are responsible for taking positive action to prevent further injury to staff, to render first aid treatment in accordance with their approved training, and to keep record of treatment provided.

First Aid Officers are also responsible for ensuring that the first aid box or kit in their workplace is kept fully stock and accessible, and for ensuring that the rest room or first aid room is kept in good condition.



Personal Protective Equipment (PPE)


Personal Protective Equipment (PPE) is the last line of defense for protecting workers. The second line of defense should involve intervention along the path, that is, adjustment of the work procedure itself and/or the introduction of mechanical devices to minimize the exposure of workers to occupational health or safety hazards: e.g., dust collectors, welding fume extraction units, exhaust fans, welding screens, etc. The implementation of safe work practices and safe job procedures should also include the proper selection, care and use of PPE.



Personal Protective Equipment (PPE) is widely used in construction because the hazards cannot be effectively controlled by using engineering or administrative controls. An example of an engineering control is designing the job/task/tool to eliminate the risk such as using tools equipped with dust collectors or using a guard on a saw. An example of an administrative control is posting signs to restrict access to an area.

Hazard and Risk Control

A control program consists of all steps necessary to protect workers from exposure to a substance or system, and the procedures required to monitor worker exposure and their health to hazards such as chemicals, materials or substance, or other types such as noise and vibration. A written workplace hazard control program should outline which methods are being used to control the exposure and how these controls will be monitored for effectiveness.

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A hazard is any source of potential damage, harm or adverse health effects on something or someone under certain conditions at work. Basically, a hazard can cause harm or adverse effects (to individuals as health effects or to organizations as property or equipment losses). Sometimes a hazard is referred to as being the actual harm or the health effect it caused rather than the hazard.

Workplace hazards can come from a wide range of sources, such as:

| Workplace Hazard | Example of Hazard | Example of Harm Caused |
|------------------|-------------------|------------------------|
| Thing | Knife | Cut |
| Substance | Benzene | Leukemia |
| Material | Asbestos | Mesothelioma |
| Source of energy | Electricity | Shock, electrocution |
| Condition | Wet floor | Slips, falls |
| Process | Welding | Metal fume fever |
| Practice | Hard rock mining | Silicosis |

Risk is the chance or probability that a person will be harmed or experience an adverse health effect if exposed to a hazard. It may also apply to situations with property or equipment loss.

Factors that influence the degree of risk include:


- How much a person is exposed to a hazardous thing or condition,
- How the person is exposed (e.g., breathing in a vapor, skin contact); and
- How severe are the effects under the conditions of exposure.

Among the critical factors in hazard and risk control is the use of PPE and firefighting equipment. Section 2 of RA 9514, otherwise known as the Revised Fire Code of the Philippines of 2008 states the policy of the State to ensure public safety and promote economic development through the prevention and suppression of all kinds of destructive fires. Henceforth, the State shall enforce all laws, rules and regulations to ensure adherence to standard fire prevention and safety measures... Section 4 embodies the provisions of the Fire Code... shall apply to all persons and all private and public buildings, facilities or structures erected or constructed...



Elimination or Reduction of Hazardous Materials and Substance

Normally, even hazardous materials such as cleaning agents made of corrosive chemicals, are continuously used. A company should be resourceful in dealing with this issue. They may minimize the use, or find alternative materials that are not harmful or less harmful to men and its environment.

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Personal Responsibilities for Safety

- Observe all precautions related to your work.
- Report unsafe conditions or any equipment or materials you think might be unsafe.
- Warn others of hazards.
- Report any injury or ill health.
- Wear protective clothing.
- Be safety conscious.
- Always inspect equipment and associated attachments for damage before using.



Ways to learn and understand SAFETY

- Accidental Experience – caused by accidents.
- Safety Education – method which makes us aware of dangerous situations
- Avoid accidents or injury.

OHS Legislations and Policies

The acts listed below have introduced significant changes to the health and safety and social welfare benefits of all workers. Thus relevant provisions of these laws are included under BOOK 4 of the Labor Code.


- Republic Act No.8282 or the “Social Security System Act of 1997”
- Republic Act No.8291 “Government Service Insurance System (GSIS) Act of 1997”
- Republic Act No.7875 (National Health Insurance Act 1995)



There are a number of policies regarding the occupational health and safety of people in the workplace. The policies are promulgated by Occupational Health and Safety Center (OHSC) under the office of the Department of Labor and Employment. Among these policies are the:

- National Workplace Policy on STD/HIV/AIDS
- Implementing Rules and Regulations on STD/HIV/AIDS
- Safety in the Construction Industry
- Substance/Drug Abuse
- Policy for Tuberculosis Control in the Philippines
- Department Order 47-03: Guidelines on SARS Prevention and Control in the Workplace

Another law relative to health and safety in the workplace is Republic Act No. 8749. It aims to achieve and maintain healthy air for Filipinos.

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SELF-CHECK 5.2-1

TRUE OR FALSE

Directions: Write **T** if the statement is correct and **F** if it is wrong. Place your answer in your answer sheet.

- _____ 1. Safety is freedom from harm.

- _____ 2. The objective of OHS standard is to protect working man against the dangers of injury, sickness or death through safe and healthful working conditions, thereby assuring the conservation of valuable manpower resources and the prevention of loss or damage to lives and properties

- _____ 3. Occupational Health and Safety Center (OHSC) is under the Department of Health.


- _____ 4. Any object commonly referred to as sharp has been contaminated with blood, body fluids or other infectious agent which could penetrate the skin or could do so if broken. Example of sharps waste include: broken glass, pipettes (glass and hard plastic), scalpel blades and lancets.

- _____ 5. Corrosivity of waste means the material has a pH, whether acidic or basic, that will corrode steel or injure human tissue. This includes materials with a pH more than 5 or lesser than 10, regardless of strength of the acid or base.

- _____ 6. Concrete and asphalt sealants are examples of special waste.

- _____ 7. Section 2 of RA 8749, otherwise known as Revised Fire Code of the Philippines of 2008, states the policy of the State to ensure public safety and promote economic development through the prevention and suppression of all kinds of destructive fires.


- _____ 8. Factors that influence the degree of risk include: how much a person is exposed to a hazardous thing or condition, how the person is exposed, and how severe are the effects under the conditions of exposure.

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ANSWER KEY 5.2-1

TRUE OR FALSE

1. T
2. T
3. F
4. T
5. F
6. T
7. F
8. T

| | | | | |
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INFORMATION SHEET 5.2-2

Waste Management

Learning Objectives:

After reading this information sheet, you must be able to:

1. Understand and appreciate the importance of waste management;
2. Know and identify the related policies, laws, rules and regulations; and
3. Apply proper waste management in the workplace.

In the maintenance of training facilities, concern on waste management is vital. Improper or mega dosage use of cleaning chemicals, mounting packing materials of delivered equipment/tools and empty or used containers, limited storing, recycling and disposal area of wastes coming from training workshops, i.e. welding stubs, electronic devices, are few of the issues to be dealt with in this topic.

Waste Management

Waste management is the collection, transport, processing, recycling or disposal of waste materials, usually ones by human activity, in an effort to reduce their effect on human health or local aesthetics or amenity. A sub focus in recent decades has been to reduce the effect of waste materials on the environment and to recover resources from them.

Waste management practices *differ for developed and developing countries, for urban and rural area and for residential and industrial produces*. Management for non-hazardous residential and institutional waste in metropolitan areas is usually the responsibility of local government authorities, while management for non-hazardous commercial and industrial waste is usually the responsibility of the generator.

Waste management can involve solid, liquid or gaseous substances with different methods and fields of expertise for each.

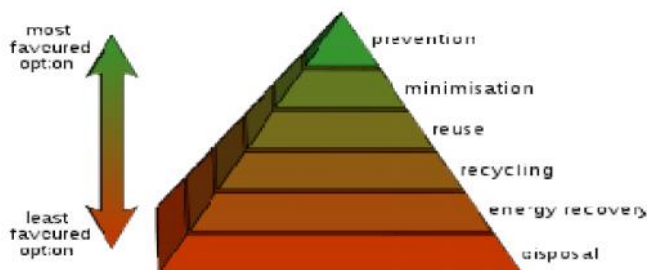



Diagram 3

Ecological waste management is the proper handling of the thing we throw away in a manner that does not harm anyone or anything, be it human, animal or the

environment. The waste hierarchy refers to the “3 Rs” Reduce, Reuse and

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Recycle which classify waste management strategies according to their desirability in terms of waste minimization. The waste hierarchy remains the cornerstone of most waste minimization strategies. The aim of waste hierarchy is to extract the maximum practical benefit from products and to generate the minimum amount of waste.

Recycling is processing used materials as waste into new products to prevent waste of potentially useful materials, reduce the consumption of fresh raw materials, reduce energy usage, reduce air pollution (from incineration, water pollution by reducing the need for "conventional" waste disposal, and lower greenhouse gas as compared to virgin production. Recycling is a key component of modern waste reduction and is the third component of the waste hierarchy.


Recyclable materials include many kinds of glass, paper, metal, plastic, textiles and electronics. Although similar in effect, the composting or other reuse of biodegradable wastes – such as food or garden waste– is not typically considered recycling. Materials to be recycled are either brought to a collection center or picked up from the curbside, then sorted, cleaned, and reprocessed into new materials bound for manufacturing.

In the strictest sense, recycling of a material would produce a fresh supply of the same material, i.e., used office paper would be converted into new office paper, or used foamed polystyrene into new polystyrene. However, this is often difficult (compared with same product from other sources), so many products or their reuse in different materials (paperboard) or too expensive producing the raw materials or recycling of materials involve producing (e.g., instead.



Diagram 4

Another form of recycling is the salvage of certain materials from complex products, either due to their intrinsic value (e.g., lead from car batteries), or due to their hazardous nature (e.g., removal and reuse of mercury from various items).


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Presidential Decree (PD) 1152, “The Philippines Environment Code,” which took effect in 1997, provides a basis for an integrated waste management regulation starting from waste source to methods of disposal. PD 1152 has further mandated specific guidelines to manage municipal wastes (solid and liquid), sanitary landfill and incineration, and disposal sites in the Philippines.

Recent laws and its implementing rules and regulations on environment and waste management include:



- **Environmental Impact Assessment**
 - *Presidential Decree (PD) 1586: Philippine Environmental Impact Statement System (PEIS)*. The law that requires that all agencies and instrumentalities of the national government including government owned and controlled corporations as well as private corporations, firms and entities must prepare an environmental impact statement for every proposed project and undertaking which significantly affect the quality of the environment.
 - *DENR Administrative Order (DAO) 03-30: PEIS Implementation Guidelines and Procedures*
- **Air Quality Management**
 - *Republic Act (RA) 8749: Philippine Clean Air (PCAA) of 1999* – The law that provides a comprehensive air pollution control policy. Specifically, this legislative intends to apply air quality management in all sources in order to implement abatement and control of air pollution.
 - *DENR Administrative Order (DAO) 2000-81: PCAA Implementing Rules and Regulations*
- **Water Quality Management**
 - *RA 9275: Philippine Clean Water Act of 2004* – The law that provides comprehensive water pollution control policy. Specifically, this legislative intends to apply water quality management in all water bodies in order to implement abatement and control of pollution from land-based sources.
 - *DENR Administrative Order (DAO) 2005-10 PCWA Implementing Rules and Regulations*
 - *PD 1067: Water Code of the Philippines*
- **Hazardous Substances and Wastes Management**
 - *RA 6969: Philippine Toxic Substances and Hazardous and Nuclear Waste Act (PTCHNWA)* – This Act mandates the regulation, restriction, or prohibition of the importation,

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manufacture, processing, sale, distribution, use, and disposal of chemical substances and mixtures that present unreasonable risk and/or injury to health and the environment.

- **Solid Waste Management**

- *RA 9003: Philippine Ecological Solid Waste Management Act (PESWMA) of 2000.* The law was passed by Congress in December 2000 and signed by the President of the Philippines on January 26, 2001 with the aim of adopting a systematic, comprehensive, and ecological solid waste management program.
- *DENR Administrative Order (DAO) 2000 – PESWMA Implementing Rules and Regulations*


- **Climate Management**

- *RA 9729, otherwise known as the CLIMATE CHANGE ACT,* is based on declared policy of the State to systematically integrate the concept of climate change in various phases of policy formulation, development plans, poverty reduction strategies and other development tools and techniques by all agencies and instrumentalities of the government.

Waste Management of Training Refuse

The waste management system is both an environmental and social issue with the existing international policies and laws including the growing concern for global warming, its strict observance is necessary. Wastes caused by training and learning activities should be determined and identified, minimized (3Rs) and proper use and storage be undertaken in accordance with OH&S. Some wastes produce in training and typical segregation/disposal activities are:

- entrails, bones, head of fish (as main material) in **food processing and commercial cooking courses** (which we usually segregate as food for other animals, dried and processed (recycled) as another product, or dumped/placed for composting to produce organic fertilizer); packaging materials of other supplies (plastic sachets or bottles of salt, pepper, vinegar); water used in washing/cleaning and processing
- used tires (can be recycled as rubber pots) busted lights, and broken glass/mirrors from the vehicle as equipment in **Automotive Servicing and Driving courses**; used oil, grease, empty cans/bottles/receptacles of lubricants, oil, liquid battery (as cleansing agent for urinals), and used spark plugs, as waste from supplies/materials.

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The following template is a sample Waste Segregation List of solid waste from GMAW NC III practical work area:

Sample Template #9


| WASTE SEGREGATION LIST | | | |
|--------------------------------------|---------------------------------|----------------|----------------|
| Qualification | GMAW NC III | | |
| Area/Section | PRACTICAL WORK AREA | | |
| In-Charge | LORENZO A. LADIA | | |
| GENERAL / ACCUMULATED WASTES | WASTE SEGREGATION METHOD | | |
| | Recycle | Compose | Dispose |
| 1. Broken welding helmet (Plastic) | X | | |
| 2. Broken welding goggles | | | X |
| 3. Torn welding gloves | X | | |
| 4. Torn/damaged welding aprons | X | | |
| 5. Torn welding aprons | X | | |
| 6. Electrode/Mig wire stubs | X | | |
| 7. Metal scraps | | | X |
| 8. Broken dark / clear glass | X | | |
| 9. Electrode/Mig wire boxes/wrappers | X | X | |
| 10. Used wires/cables | X | | |
| 11. Used rags/cleaning materials | | X | X |
| 12. Used bulbs | | | X |

We must Segregated Resources Waste = order to we have to biodegradable from non-(recyclable)



remember that Waste = and Mixed Garbage. In reduce waste, segregate the (compostable) biodegradable waste.

In the disposal of waste, observance to the prevailing laws, rules and regulations is crucial. These can be contained in the Waste Management System or Manual of the organization.


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SELF-CHECK 5.2-2

MULTIPLE CHOICE

Directions: Select the best answer from the choices indicated after the number. Write the letter of your choice in your answer sheet.


1. This refers to the 3Rs which classify waste management strategies according to their desirability in terms of waste minimization.
 - A. Waste hierarchy
 - B. Waste management
 - C. Waste reduction
 - D. Waste segregation
2. It is the collection, transport, processing, recycling or disposal of waste materials usually ones produced by human activity, in an effort to reduce their effect on human health or local aesthetics or amenity.
 - A. Waste Hierarchy
 - B. Waste Management
 - C. Waste Reduction
 - D. Waste Segregation
3. In waste management, segregated waste could be _____.
 - A. Biodegradable
 - B. Recyclable
 - C. Reduced
 - D. Any of the above
4. RA 6969 refers to _____.
 - A. Toxic Substance and Hazardous and Nuclear Waste Control Act
 - B. Clean Air Act
 - C. Ecological Solid Waste Management Act
 - D. Pollution Control Act
5. The Ecological Solid Waste Management Law was enacted in _____.
 - A. 1999
 - B. 2000
 - C. 2001
 - D. 2002

| | | | | |
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ANSWER KEY 5.2-2

MULTIPLE CHOICE

1. A
2. B
3. D
4. A
5. B

| | | | | |
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TASK SHEET 5.2-1

Module Title : Maintaining Training Facilities

Learning Outcome : Implement Housekeeping Activities

Task : Prepare a Waste Segregation List

Learning Objective: After reading the Information Sheets 5.2-1 to 5.2-2, you must be able to prepare a Waste Segregation List of **solid waste** in your area/workshop by using the Blank Template #5.


Time Allotment: 20 minutes

Materials and equipment needed:

- Blank Template # 5
- Laptop/PC
- Pencil/Pen
- Bond Paper
- Manual of Procedures in Maintenance of Facilities
- Schedule of Activities of the School/Center
- Organization's waste management policy, rules and regulations

Procedure:


1. Prepare all your reference materials and laptop/PC.
2. Identify the course/qualification.
3. Recall and identify the waste materials produced during training.
4. Classify and segregate the waste/items.
5. Determine and tick the column of Blank Template #5 corresponding to such waste/item falls.
6. After completion, call your facilitator who will guide you and check your work after doing this activity.

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| WASTE SEGREGATION LIST | | | |
|----------------------------|--------------------------|---------|---------|
| Qualification | | | |
| Area/Section | | | |
| In-Charge | | | |
| GENERAL/ACCUMULATED WASTES | WASTE SEGREGATION METHOD | | |
| | Recycle | Compose | Dispose |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
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PERFORMANCE CRITERIA CHECKLIST 5.2-1

| CRITERIA | Yes | No |
|--|-----|----|
| Did the trainee prepare the needed tools and equipment for the task? | | |
| Did the trainee identify the area of the training program/course for the activity? | | |
| Did the trainee identify all the solid waste produced in the area? | | |
| Did the trainee segregate all the solid waste produced in accordance with the organizational policy/rules/ regulations, and existing laws? | | |
| Was the task completed within the required time limit? | | |


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| LEARNING OUTCOME 3 | MAINTAIN TRAINING EQUIPMENT AND TOOLS |
|--|--|
| CONTENTS: Types of Maintenance Maintenance Practices and Procedures | |
| ASSESSMENT CRITERIA: <ul style="list-style-type: none"> Regular maintenance activities and routine servicing/repair are performed according to scheduled plan. Maintenance procedures are followed in accordance with the manufacturers manual and organization policies. Respond to unsafe equipment in accordance with organizational policies and procedures. Equipment and tools are secured according to safety standards. Complex faults or repair requirements outside area of responsibility or competence are reported for specialist assistance in accordance with organizational procedures. Maintenance activities are documented and reported according to procedures. | |
| CONDITIONS: The trainees must be provided with the following: <ul style="list-style-type: none"> Training Resources <ul style="list-style-type: none"> References (books) Audio/Video materials Module/Manuals Tools Materials/Consumables Training Facilities/Area <ul style="list-style-type: none"> Work stations Equipment/Machines Spare parts/Components | |
| METHODOLOGIES: <ul style="list-style-type: none"> Lecture/Group discussion Self-learning/Self-paced instruction Simulation | |

| | | | | |
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ASSESSMENT METHODS:

- Portfolio
- Written Test
- Demonstration/Questioning

| | | | | |
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LEARNING EXPERIENCES

Learning Outcome 3

Maintain Training Equipment and Tools

| Learning Activities | Special Instructions |
|--|---|
| Read Information Sheet 5.3-1 on Types of Maintenance. | <p>You may refer to Manufacturer/ Equipment Manuals and Organizational Procedure/Manuals on Maintenance for additional information.</p> <p>In comparing your answers from the model answer, be sure that all your answers are correct before proceeding to the next activity.</p> <p>In performing the task sheets, compare your output with the sample template provided in the Information Sheet/s. Assess/ Evaluate your work according to the performance criteria checklist. Make the corrections or improvements, if necessary. Secure the evaluation of your trainer and let him record your accomplishment/s.</p> <p>If all the learning activities are undertaken, proceed to the next Learning Outcome on Document Inspection and Maintenance.</p> |
| Answer the self-check to measure your knowledge on the topic. Compare answers with the model answer. | |
| Read Information Sheet 5.3-2 on Maintenance Procedures and Practices | |
| Answer the self-check to measure your knowledge on the topic. Compare with the model answer. | |
| Perform Task Sheet 5.3-2a on Tagging-out and Reporting. | |
| Perform Task Sheet 5.3-2b on Breakdown/Repair Report. | |

INFORMATION SHEET 5.3-1

Types of Maintenance

Learning Objective: After reading this INFORMATION SHEET, you must be able to understand the different types of maintenance and maintenance program.

Maintenance is work that is done regularly to keep equipment, building and grounds in good condition and working order. We need to learn the different kinds of maintenance in order to identify the activities and proper procedures in the management of facilities as well as the time, money and materials involved.

Types of Maintenance

The principal objectives of maintenance can be clearly defined as follows:


1. To extend the useful life of assets (i.e. every part of the site, building and contents).
2. To assure the optimum availability of installed equipment for protection (or service) and obtain the maximum possible return of investment.
3. To ensure operational readiness of all equipment required for emergency use.
4. To ensure the safety of personnel using facilities.



Generally, there two (2) types of maintenance system:

- a. Planned
- b. Unplanned

A. Planned Maintenance – *Work activities are performed as scheduled/ expected. Work is based- on pre- conceived/ planned activities. Example: Changing of oil of car engine, this is controlled by two factors a) mileage, b) time or whichever comes first.*

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The best source of information about scheduled maintenance is from the manufacturer. The owner's portfolio that came with the product when it was new should include a scheduled maintenance booklet that may be incorporated in with the owner's manual or it may be a separate booklet. If the maintenance schedule booklet cannot be found, most manufacturers will have that information on their website. Simply do a search for the manufacturer on the Internet. When the manufacturer's site is located, look for a tab for owner information and the maintenance schedule should be found there.



A.1 Preventive Maintenance – Maintenance performed to PREVENT or FIND failures BEFORE they develop into a breakdown.



- **Time-based Maintenance** – based on calendar days or running hours or usage. (Inspection, cleaning, lubrication, programmed replacement and repairs). Example: Change oil every month or every 5,000 km.
- **Conditioned-based Maintenance** – visual monitoring and condition monitoring technique (temperature, hydraulic fluid wear, surface condition, crack, leaks, vibration, corrosion/erosion, electric insulation, etc.).




A.2 Predictive Maintenance – Maintenance performed at a predetermined periods when the maintenance activity is most cost effective and before the equipment fails. The conditioning of equipment maybe done by the trainees or out-sourced based on the schedule of the vehicle maintenance. There are manufacturers or dealers who also provide after sales service or simply provide maintenance exclusive of products they produced.

A.2.1 Corrective Maintenance – Maintenance tasks initiated as a result of the observed or measured condition of an asset or system, before or after functional failure, to correct the problem. It is performed to REPAIR, RESTORE, REPLACE or CORRECT a failure. This activity may consists Corrective maintenance maybe planned or unplanned.



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A.2.2 Controlled Maintenance (or Proactive Maintenance) – maintenance performed to stabilize the reliability of machines or equipment or to condition improvement/enhancement of equipment. *Example:* Engine overhaul.

A.2.3 Breakdown Maintenance (or Reactive Maintenance) – it is maintenance performed as a reaction to failure or fails while in operation. *Example:* Repair of vehicle when the vehicle broke down while on travel

B. Unplanned Maintenance – Maintenance performed unexpectedly

B.1 Emergency – maintenance performed to put the item on hand IMMEDIATELY to avoid serious consequences, i.e. loss of production, disrupted schedule, extensive damage to assets, idle workers or for safety reasons. *Example:* A hacksaw blade breaks-up during operation, this is an unplanned situation, what you need to do is buy new blade and replace it.



Emergency maintenance repairs should be requested as soon as you become aware of a problem. The maintenance staff will respond to emergencies as soon as possible to make necessary repairs with or without an appointment. There are instances where you have to notify the security personnel, the fire department, or other concerned office if the emergency will cause serious damage to property and for safety reasons.

Types of Maintenance

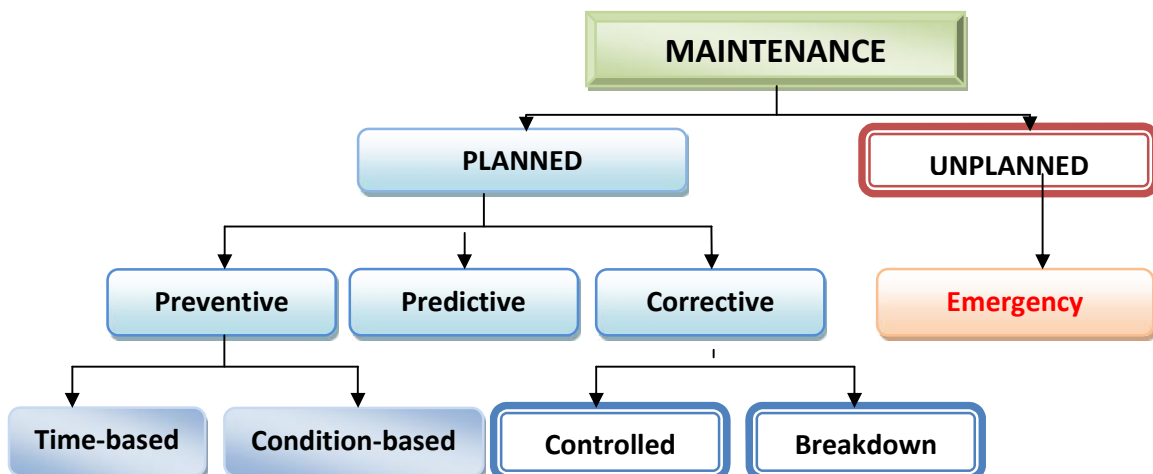



Diagram 5


| | | | | |
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SELF-CHECK 5.3-1

IDENTIFICATION

Directions: Identify the term or terms described by the sentence. Write your answer on your answer sheet.


1. Work that is done regularly to keep equipment, building and grounds in good condition is called _____.
2. Predictive maintenance performed at a _____ periods when the maintenance activity is most cost effective and before the equipment fails.
3. Corrective maintenance is a maintenance performed to correct or repair a failure. Maintenance performed to stabilize the reliability of machines or equipment is _____ maintenance.
4. An example of breakdown maintenance is the repair of equipment when it bogged down during operation. Breakdown maintenance is also called _____ maintenance.
5. The type of preventive maintenance which is based on calendar days or running hours or usage is _____.
6. A type of maintenance which involves monitoring of temperature, hydraulic fluid, wear, surface condition, crack, leaks, vibration, corrosion/erosion, etc., is called _____.
7. _____ maintenance is performed to PREVENT or FIND failures BEFORE they develop into a breakdown.
8. Reactive maintenance is also called _____ maintenance.
9. The purpose of _____ is to provide procedure in operating an instrument that is unreliable or not in normal operation condition and should either be operated with extra care or left alone.
10. Replacing parts to restore piece of equipment to full operating condition is called _____.

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MODEL ANSWER 5.3-1

IDENTIFICATION

1. Maintenance
2. Predetermined
3. Controlled or Proactive Maintenance
4. Reactive Maintenance
5. Timed-Based Maintenance
6. Condition- Based- Maintenance
7. Preventive Maintenance
8. Breakdown
9. Tag-out
10. Repair

| | | | | |
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INFORMATION SHEET 5.3-2

Maintenance Procedures and Practices

Learning Outcome: After reading this INFORMATION SHEET, you must be able to know the common maintenance procedures and practices of training facilities as a reference in the development of your maintenance program.

It is important to learn the different procedures and practices in the maintenance of training equipment in order to draw from these and plan the suitable maintenance program for our own organizations.

Maintenance of Tools and Equipment

The proper use of the training tools and equipment is the first and foremost task in the maintenance. They must be able to use them in accordance to the manufacturer's manuals, as this would evidently extend the life of the equipment and tools. The Manual would indicate the part of the equipment, the functions of each part and the way to maintain it. We must always refer to it for reference. The user's manuals must be kept handy and within the Trainer or designated area for immediate reference.




Maintenance Procedures and Practices

Maintenance procedures and practices differ from one school or to another. Simple procedures may work in a small organization or in a medium-sized school with organized structure. The more complex an organization, the more complex the system is. Hence, the adoption of computerized system in maintenance is prescribed.

Inventory is initially prepared to check the items that are present, available for use, operational, and adequate for the training activities. As to



the presence of the items, the trainer ought to check if the items such as chemicals, has not yet expired or its utilization is before its expiration dates. For equipment, it is advisable to check if all the parts are still functional, i.e. elasticity of rubber, strength of coil, etc. It is best to inspect during the inventory, the status of training materials to be indicated in the inventory as basis for requisition. The stored training materials and its location/position in the storeroom/tool room, i.e. tools, equipment, extension wires, PPEs, should also be inspected. There may be cases where stored oiled seeped in welding gloves which may cause

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accidents during its use, electric wires has cuts or open wires after storage for long periods, chisel or blades have chipped ends due to mishandling.

In the requesting of required training materials, it is essential to indicate the complete specifications of the items in order to secure the needed items and ensure delivery of quality items. This is important to prevent accidents, damage or injury caused by the usage or presence of low-quality materials in the workshop area.


The training facilities should also be inspected. For example, in Plumbing - check the steady supply of water, if there are leaks in pipes, if faucets are in order; in Refrigeration and Air-conditioning, in case of additional equipment, check if the power supply can still accommodate, adequate outlets are available. If the items are not yet ready but it is necessary to run the training program, **tagging-out** shall be useful. Tagging-out, when properly conducted and reported, will serve as basis for appropriate action, i.e. repair, purchase of required parts. In this case, a **work order/request** or **job order form** (sample is shown in Template #10) comes in to be submitted by the trainer or in-charge of the facility. In big organization, tagging-out is a major activity and audits are conducted periodically. Others have index or ledger cards to reflect the equipment or facility tagged-out.

Sample Template #10

| WORK REQUEST | |
|--|--|
| Unit No.MM-01 | Description: MILLING MACHINE (MICROCUT) |
| Observation/s: Defective motor | Date Reported: Jan. 20, 2012 |
| | Reported by: Lorenzo A. Ladia |
| Activity: Replacement of motor | Date completed: February 8, 2012 |
| | Signature: Ronnell Mirasol |
| Spare parts used: New motor | |

Housekeeping Schedules, House Rules, and Operation Procedures (for equipment or facility), are some of the essential items to be crafted and posted to serve as guides for the trainees to observe. (See previous topics for the sample templates.)

During the training, if case of malfunctioning of equipment or facility breakdown, this is immediately reported to concerned personnel especially if it will cause damage to people or property, i.e. water pipes burst, industrial

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sewing machine is grounded, etc. Normally, an incident or breakdown report is prepared and submitted followed by a work request or job order. In some cases, the breakdown report is with pre and post-inspection report in the same form or sheet. Or, inspection and acceptance report form are further filled-in aside from the incidental report. This will depend on the maintenance system or established practices in an organization. A **salvage report** is further submitted after the repair or conditioning of the equipment.


Below are examples of breakdown/repair report and salvage report.

Sample Template #11

| BREAKDOWN / REPAIR REPORT | |
|--|--|
| Property ID Number | MM-01 |
| Property Name | MILLING MACHINE (MICROCUT) |
| Location | WELDING AND FABRICATION WORK SHOP |
| Findings: Defective motor | Recommendation: Replacement of motor |
| Inspected by: Jean Casas | Reported to: Ronnell M. Mirasol |
| Date: Jan. 20, 2012 | Date: Jan. 20, 2012 |
| Subsequent Action Taken: Inspection of the equipment | Recommendation: Replacement of motor |
| By: Technician | Reported to: Nomer M. Pascual |
| Date: Jan. 25, 2012 | Date: Jan. 25, 2012 |

Sample Template #12

| SALVAGE REPORT | | |
|--|---|--|
| AREA / SECTION | Practical Work Area / Computer Laboratory | |
| IN-CHARGE | Marie Quina | |
| FACILITY TYPE | PART ID | RECOMMENDATION |
| Floor Model – High Speed Color Printer | Ink Cartridge | Store as back-up cartridge for other floor model printer |
| Computer Desktop | Fan | Forward to CES/CHS Workshops as Instructional Material |

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Importance of Preventive Maintenance

Preventive maintenance is the regular inspection and repair of equipment and facilities to prevent extensive, costly damage from occurring over time. Preventive maintenance can go a long way toward reducing the overall cost of your training facilities and equipment, as large expenditures for repairs and replacements can often be avoided by a careful attention to detail. Following a thorough preventive maintenance checklist can help you to delay the deterioration of the structure or equipment and lessen your maintenance costs in the long run.

Generally, preventive maintenance is practiced to avert further damage to properties and to people and subsequent financial loss. Though costly at first, preventive maintenance is better.

Inspections

Perform regular inspections on all equipment and facilities that are subject to damage or normal wear and tear. Inspect such things as roofs, pools, insulation, ventilation systems and appliances to ensure that they are operating safely and efficiently. Make inspection a priority among your trainees especially if it the course/qualification is related, i.e. RAC students to check on insulation, ventilation; create thorough checklists that must be marked off and signed by the inspecting group or authorized person, and hold inspectors accountable for the thoroughness of their examinations.



Cleaning


Stick to a regular cleaning schedule for fixtures such as air ducts, pools and exterior siding to ensure that dirt, mildew and other buildup does not cause any damage. Clean and replace filters in heating and air conditioning units, as well as appliances such as washing machines and dryers (CES class can be assigned to this), to prevent fire damage. New or cleaned filters also help to keep electricity costs down, as the appliances can operate more efficiently with an unrestricted flow of air.



Pest Control



Bring pest control specialists into your facility at least once per year, even if your students have not complained about pests. Common pests such as cockroaches and termites can increase their populations rapidly and can quickly infest an entire property, causing extensive damage to interiors and electrical infrastructure. Act

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proactively to ensure that pests do not gain a foothold, and respond quickly to any pest complaints.

Testing

Test emergency equipment such as sprinkler systems, smoke alarms and fire extinguishers to ensure that they remain in working order. Properly maintained safety equipment can prevent a small mishap from becoming a major disaster. Consider hiring a third-party service provider to audit your safety systems to ensure that they go above and beyond minimum state requirements; it can be well worth the extra investment in the case of a fire or other damaging event. This can be included in the Maintenance Manual.

Sealants

Initiate the reapplication of all sealants at least once every 5 years. Sealants such as deck waterproofing, exterior paint and window caulking can corrode over time, exposing your facility to the risk of internal damage. Reapplying these substances every few years not only helps to keep your structure strong, it can also cut down on energy and repair bills in the future.




Budget

Encourage the an ample budget for procedures at the you try to save money by maintenance expenditures, amount in the short run, much larger amount when replacement is needed. Set spend wisely on preventive maintenance without cutting into your operating budget.



allotment or setting aside preventive maintenance beginning of each year. If scrimping on preventive you may save a small but you stand to lose a a full-scale repair or aside enough money to

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TASK SHEET 5.3-2a

Module Title : Maintaining Training Facilities

Learning Outcome : Implement Housekeeping Activities

Task Title : Tagging-out and Reporting

Learning Objective: After reading the Information Sheets 5.1-1 to 5.3-2, and given the materials, equipment and procedures, you must be able to identify and tag-out material/equipments and document tagged items/area in a logbook or ledger card


Time Allotment: 30 minutes

Materials and equipment needed:

- TR/CBC
- Inventory of Tools and Equipment
- Laptop/PC
- Blank Template # 6 (Tag-Out Index Card)
- Organization/School Policy/Regulations on Maintenance Program
- Tagging-out materials (colored paper, board-tip marker pen, pins or adhesives)

Steps/Procedure:


1. Identify an area or workshop.
2. Identify the tools/equipment which is defective, worn-out, dangerous or equipment with improper operation of a component or a portion of a system that was isolated or in abnormal operation in the area.
3. Write the proper signs or labels to caution or warn users or concerned individuals. The signs or labels must be clear and visible at a distance of 5 meters.
4. Place the sign or label in the appropriate part of the tool or equipment or adjacent/near the equipment.
5. In blank template # 6, list all the items that were tagged. Be sure to complete the information.
6. Call your facilitator who will guide you and check your work after doing this activity.

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TAG-OUT INDEX CARD


Blank Template #6

| LOG SERIAL | DATE ISSUED | TYPE (Danger/Caution) | DESCRIPTION (System Components, Test Reference, etc.) |
|---------------|----------------|--------------------------|---|
| | | | |
| | | | |
| | | | |
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Performance Criteria Checklist 5.3-2a

| CRITERIA | YES | NO |
|--|-----|----|
| Did the Trainee identify all the items to be tagged in the area? | | |
| Was the safety of tools and equipment observed in tagging accordance with manufacturer's instruction/manual? | | |
| Was the tag document appropriate to the condition of the equipment? | | |
| Were the tags clear, visible and placed in suitable location? | | |
| Was tagging-out complete (no items supposed to be tagged was missed)? | | |
| Was the tag-out index cord properly filled-up? | | |
| Was the tag-out done within the specified time? | | |

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TASK SHEET 5.3-2b

Module Title : Maintaining Training Facilities

Learning Outcome : Maintain Training Equipment and Tools

Task : Prepare a Breakdown/Repair Report

Learning Objective: After reading the Information Sheets 5.3-1 and 5.3-2, using the BLANK TEMPLATE 7, you must be able to prepare Breakdown/Repair Report.


Time Allotment: 30 minutes

Materials and equipment needed:

- Blank Template # 7
- Equipment Record
- Laptop/PC
- Ballpen/Pencil

Procedure:


1. Prepare all your reference materials and laptop/PC.
2. Fill up all items in Blank Template #7
3. Identify the damaged tools/equipment.
4. Identify the nature of breakdown of the equipment.
5. Recommend possible solution.
6. Call your trainer who will guide you and check your work after doing this activity

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| BREAKDOWN / REPAIR REPORT | |
|---------------------------------|-----------------------------|
| Property ID Number | |
| Property Name | |
| Location | |
| Findings | Recommendation |
| | |
| Inspected by: | Reported to: |
| Date: | Date: |
| | |
| Assigned to: | Received Assignment: |
| Date: | Date: |
| | |
| Subsequent Action Taken: | Recommendation: |
| By Technician | Reported to: |
| Date: | Date: |

Performance Criteria Checklist 5.3-2a

| CRITERIA | YES | NO |
|--|-----|----|
| Did the trainee prepare the needed equipment for the task? | | |
| Was the recommended activity for the repair appropriate based on the nature of breakdown? | | |
| Was the reporting procedure in accordance with established organizational policy, rule or regulations? | | |
| Was the form properly accomplished? | | |
| Was the tag-out done within the specified time? | | |

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| LEARNING OUTCOME 4 | DOCUMENT MAINTENANCE INSPECTION |
|--|---------------------------------|
| <p>CONTENT:</p> <p>Documentation of Inspection and Maintenance</p> | |
| <p>ASSESSMENT CRITERIA:</p> <ul style="list-style-type: none"> Regular inspections are carried out in the work area according to workplace procedures and standards Maintenance and repair activities are documented and reported according to organizational policies Documents and record keeping | |
| <p>CONDITIONS:</p> <p>The trainees must be provided of the following:</p> <ul style="list-style-type: none"> Training resources <ul style="list-style-type: none"> References (books) Audio/Video materials Modules/Manuals Tools Materials/Consumables Training Facilities/Area <ul style="list-style-type: none"> Work stations Equipment/Machines Furniture/Fixtures | |
| <p>METHODOLOGIES:</p> <ul style="list-style-type: none"> Lecture/Group discussion Simulation Self-learning instruction | |
| <p>ASSESSMENT METHODS:</p> <ul style="list-style-type: none"> Written Test Demonstration/Oral Questioning | |


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LEARNING EXPERIENCES

Learning Outcome 4

DOCUMENT MAINTENANCE INSPECTION

| Learning Activities | Special Instructions |
|--|---|
| Read Information Sheet No. 5.4-1 on Document Maintenance Inspection | You may refer Organizational Procedure/Manuals on Maintenance for additional information. |
| <p>Answer the self-check to measure your knowledge and skills on the topic.</p> <p>Compare with the model answer.</p> | <p>In comparing your answers from the model answer, be sure that all your answers are correct before proceeding to the next activity.</p> <p>After completing all the activities in the different Learning Outcomes of Maintain Training Facilities, you may undergo the <u>institutional assessment</u> for the said competency.</p> <p>After passing the institutional assessment, proceed to other competencies of Training Methodology Level I.</p> |

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INFORMATION SHEET 5.4-1

Document Maintenance Inspection

Learning objectives: After reading this Information Sheet, you must be able to:

1. know and understand the relevance of documentation and reporting; and
2. identify and determine the proper forms to use in maintenance activities.

There is a need to put into writing the different activities pertaining to the maintenance of the facilities and equipment and other learning materials in the training institution explaining how your system works, how to use such facilities and equipment, how to maintain and how to dispose them if their useful life has ended.

Complete, accurate, and current documentation is essential to an effective maintenance program. Whether performing preventive, predictive, condition-based, or reliability-centered maintenance, keeping track of equipment condition and maintenance—performed and planned—is critical.




Importance of Documentation

Documentation is a must in the modern world. Essentially, quality documentation is the type of documentation where a physical process or activity is conveyed through the medium of writing by having it noted down in a document of some kind. This is a necessity due to several reasons. Most importantly, it allows errors to be isolated and successes to be replicated. Documentation also helps you to guard against the risk of potential litigation.

One of the most important parts of running any successful or organization is to make sure that you always have clear precise documentation of every single important transaction, process, and action that takes place. This will allow you to have a clear reference point whenever anything is in question. Additionally, the chances of processes and actions deviating from their expected results are very low when there is a comprehensive and systematic database of documentation concerning the appropriate requirements and procedures that need to be implemented.

Reason for Documentation

The reason for the reporting and documentation process is to collect data that can be used to optimized efficiency and enable cost- effective decisions and actions. It gives those carrying out the works the information they need. Documents are also used to prepare cost estimates and to obtain tenders from prospective contractors.

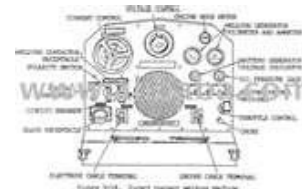
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Complete, accurate, and current documentation is essential to an effective maintenance program. Whether performing preventive, predictive, condition-based, or reliability-centered maintenance, keeping track of equipment condition and maintenance—performed and planned—is critical.

Documentation should be prepared by qualified personnel. The key to good documentation is to correctly identify the problem to be solved, and hence to specify an appropriate solution. The nature and extent of the work must then be clearly conveyed to those who will do it. This information sheet discusses firstly **what** to document, and secondly **how**.

Other documents that are important relative to maintenance are *drawings* and specification.

Drawings are usually the most efficient way to convey what something looks like, how big it is and how it fits together. It is important for the trainer to be provided with the drawing of the machines under their custody to be able to identify probable defects or missing part. Drawings could provide the relevant information to the technician if repairs are done in-house. Trainers should maintain a ledger card for this purpose.



Sample Template #14

| EQUIPMENT RECORD W/ CODE AND DRAWING | | | | | | | |
|---|-----------------|----------------|------------|-----------------------|--|---------------|---------------------|
| No. | Location | Eqpt. # | Qty | Title | Description | PO No. | Drawing Ref. |
| 1 | M 04 | G 1001 | 3 | Pipeline Booster Pump | Welds Pumps Ltd. Size/Type OK Serial No. A11556-001 B11556-002 | 10200 GO | 02 1020 E |
| 2 | M04 | G 1002 | 2 | Motor | Brook Crompton Frame: 280th | 10200 GO | 02 1021 E |
| | | | | | | | |
| | | | | | | | |


A **specification** is a written description of the materials and techniques to be used in the work. Most project specifications incorporate references to standard specifications.

Maintenance Forms

Typical forms used in maintenance either in preventive or emergency repairs are Breakdown/Repair Report. Others have Incident/Observation Report Form. In requesting work, Job Order or Work Request Form is used.

At times, pre-inspection is done before repair. Another inspection is done after the conditioning or repair of equipment. This activity is documented in an *Inspection Report*



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Form. At times, only one sheet or form is used for the following: Repair/Breakdown Report, Work Request, Inspection and Salvage or Waste Material Report. This shall depend on the procedures and structure of the organization.

Some organizations also conduct regular inspections of all their facilities. The frequency of inspections and the people who conducts inspection is contingent on the policy of an organization.


Sample Template #14 is an Inspection Report for all GMAW welding equipment in GMAW workshop while Sample Template #15 is an inspection of all equipment in the practical work area of Computer Hardware Servicing.

Sample Template #15

| INSPECTION REPORT | |
|--|---|
| Property ID Number | GMAW-01 To-10 |
| Property Name | GMAW WELDING MACHINE |
| Location | WELDING AND FABRICATION |
| Findings: All equipment are functional | Recommendation: All equipment are ready for training purposes |
| Inspected by: Lorenzo A. Ladia | Reported to: Nomer M. Pascual |
| Date: Jan.20. 2012 | Date: Jan. 20, 2012 |

Sample Template #16

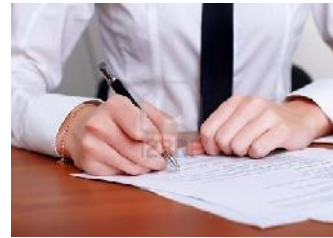
| INSPECTION REPORT | | | |
|---------------------------|---|--------------------------------------|---|
| Area / Section | Practical Work Area / Computer Laboratory | | |
| In-Charge | Marie Quina | | |
| FACILITY TYPE | INCIDENT | ACTION TAKEN | PROGRESS / REMARKS |
| Printer – HP Deskjet 695C | Overheating | Sent to HP service center for repair | Cannot be repaired; replace printer |
| Monitor of PC No. 1 | Black out | Sent to computer technician | Cannot be repaired; replace monitor |
| Monitor of PC No. 2 | Static screen | Sent to computer technician | Buy monitor parts and replace damaged parts |
| Reported by: | | Date: | |

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Reporting Process

Based on the inspection report, undertake the following:

1. Analyze inspection report;
2. Investigate condition of facilities based on the inspection report and in conformance with the standard;
3. Prepare repair improvement schedule to correct malfunctions and damage ((if any); and
4. Install continues maintenance on facilities.



Documentation Process

Collecting data shall be the first job to be accomplished.


1. Data collected shall be used as reference for technical information or as a basis to structure the equipment and facilities inventory.
2. The inventory shall be used as one of the bases in planning the maintenance of equipment and facilities as well as in documentation

Types of Documents in the Maintenance of Facilities

1. Equipment and Facilities Inventory. This can also be called construction or engineering documents which shows:
 - Comprehensive list of equipment/facilities with corresponding number and description
 - Functional relations between equipment/areas housed by each building
 - Geographical position/location of equipment and facilities (includes shop layout and vicinity maps)
2. Technical Documentation. Any documents useful for maintenance are:
 - Mechanical, electrical, architectural, plumbing and equipment plans
 - List of components and spare parts of each equipment
 - Parts and functions of areas housed in each building including ducting, if any.
 - Equipment user manuals with details of the functions, operations, etc.
 - Work and repair manuals for each equipment or any document explaining how it can be repaired
 - Maintenance manuals

Equipment and Facilities History

- Information on life of equipment (date of installation/construction, repairs/replacements, refurbishment, etc.)
- Information in cost of equipment and construction/improvement of facilities (considering also the cost of repairs whether major or minor)

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A **historical record** is a basic component of any maintenance system. All maintenance and repair activity of an equipment item should be reported for inclusion in an historical record. A single record that contains the complete maintenance history of the item, including preventive maintenance, breakdown, repair, and rebuild data should be maintained.




The **minimal information** required to establish a record in a system should consist of the following four items:

- an identification number for the piece of equipment or work activity (What)
- the location of the maintenance work (Where)
- a determination of what operations are to be performed and how often (Why, when, and How)
- a judgment as to what craft skills is required to perform the operation (Who)

Monitoring, Recording and Reporting

1. The Trainer/Authorized Staff shall maintain and keep a complete set of the following documents for each equipment and facility:
 - Inventory
 - Technical information, and
 - Operation and maintenance manuals
2. The following records shall be maintained and filed in complete sets:
 - Inspection record
 - Breakdown record, and
 - Repair and maintenance record
3. Records shall be arranged according to:
 - Number of breakdowns
 - Maintenance cost
 - Repair and maintenance details, and
 - Material consumption
4. All other information concerning equipment and facilities effectiveness interventions shall be recorded accordingly.
5. All information concerning any operation intervention shall be recorded for monitoring and reporting purposes.
6. Then information necessary for the documentation of works shall be as follows:
 - Maintenance listing
 - Manpower utilization
 - Work backlog
 - Material cost
 - Cost analysis

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Reports that lead to the identification of work pertains to how a maintenance department determines requirements for craft labor hours. The various methods of identifying work are:

- complaints
- emergency service calls
- foreman's inspection
- manufacturer and safety standards
- periodic maintenance
- inspection by craftsmen or inspection group
- formalized planning



Storing Documents

- Available documents must be kept-up-to-date
- Each document must have a title and a control internal number
- The list shall mention where certain documents are, considering that not all documents are always in the maintenance division (location and responsible personnel).


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SELF-CHECK 5.4-1

MULTIPLE CHOICE

Directions: Choose the best answer for each number. Write the letter of your choice in your answer sheet.


1. A historical record of equipment
 - A. Can be attached as a tag in an equipment
 - B. Can be disposed of as soon as the work required is accomplished
 - C. Is the same as a work order
 - D. Should contain all maintenance and repair activity of an equipment item
2. Reports that lead to the identification of work pertain to how a maintenance department determines requirements for craft labor hours. The _____ is the least method of identifying emergency work.
 - A. Breakdown report
 - B. Complaints
 - C. Emergency service calls
 - D. Formalized planning
3. Maintenance would consist of the following except:
 - A. Inspection of equipment before repair
 - B. Lubricating, adjusting, and replacement usually classified as preventive maintenance
 - C. Replacing parts to restore a piece of equipment to full operating condition
 - D. Work necessary to restore equipment to operation on quick-fix basis in the event of breakdown
4. In the reporting process and based on the inspection report, the first thing to undertake is:
 - A. Analyze inspection report
 - B. Install continues maintenance on facilities
 - C. Investigate condition of facilities based on the inspection report and in conformance with the standard
 - D. Prepare repair improvement schedule to correct malfunctions and damage ((if any)

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MODEL ANSWER 5.4-1

MULTIPLE CHOICE

1. D
2. D
3. C
4. A

| | | | | |
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GLOSSARY OF TERMS

Housekeeping would cover those janitorial and grounds keeping activities necessary to provide clean and orderly facilities and grounds.

Inspection would involve periodic inspection of equipment to insure safe and proper operation, assuring that periodic maintenance is performed, control of the quality of the work accomplished by maintenance craftsmen, inspection of materials and parts received from vendors, and examination of items removed during repair or overhaul operations to determine the feasibility of repair.

Maintenance would consist of the lubricating, adjusting, and routine replacement usually classified as preventive maintenance. It would also include work necessary to restore equipment to operation on a quick-fix basis in the event of a breakdown.

Organizing in a maintenance department is the grouping of activities necessary to achieve the mission of the department and the assignment of each group to supervisor.

Overhaul would involve the reconditioning of equipment: teardown, replacement, reassembly, and testing.

Periodic maintenance is preferred over *preventive maintenance* because a comprehensive program encompasses maintenance operations that go beyond the prevention of equipment breakdown. Properly planned, a periodic maintenance program can effectively identify who, what, when, where, why, and how specific repetitive operations are to be performed . . . expand a system to schedule repetitive inspection and maintenance of building equipment, utility distribution systems, janitorial services, grounds keeping and gardening activities, and the painting of buildings.

A specific **work order** is prepared to accomplish each of these types of periodic maintenance system. Where several kinds of maintenance are required for a given item, a separate schedule is established for each operation. For example, a machine tool may have separate schedules for lubrication, electrical checks, mechanical checks, and tolerance checks. For each of these activities, a separate work order is generated at the prescribed time and distributed to the appropriate craft skill.


Planning involves the selection of objectives and the determination of the policies, programs, and procedures to be used for the achievement of the selected objectives.

Repair would consist of replacing parts to restore a piece of equipment to full operating condition, and to alleviate undesirable conditions found during periodic maintenance or breakdown.

Responsibilities that are normally assigned to the maintenance department are the health and safety of the public and employees, minimization of downtime hours on production or building equipment, housekeeping and keeping the general appearance of the facilities presentable. The ultimate goal should be to optimize the use of every maintenance dollar spent in achieving the assigned mission.

Salvage would involve the reclamation and disposition of surplus material and scrap.

Scheduling is a method of planning that cites specific objectives to be accomplished in relation to time. Inherent maintenance program is the use of schedules to delineate when specific types of maintenance are to be performed....The major thrust of work scheduling is to improve the efficiency of the maintenance department.

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ATTACHMENTS

**REPUBLIC ACT NO. 9003
(ECOLOGICAL SOLID WASTE MANAGEMENT ACT OF 2000)**

**AN ACT PROVIDING FOR AN ECOLOGICAL SOLID WASTE
MANAGEMENT PROGRAM, CREATING THE NECESSARY
INSTITUTIONAL MECHANISMS AND INCENTIVES, DECLARING CERTAIN ACTS PROHIBITED
AND PROVIDING PENALTIES, APPROPRIATING FUNDS THEREFOR, AND FOR OTHER
PURPOSES.**

**CHAPTER I
BASIC POLICIES**

**Article 1
General Provisions**

SECTION 1. *Short Title.* - This Act shall be known as the "*Ecological Solid Waste Management Act of 2000.*"

Sec. 2. *Declaration of Policies.* - It is hereby declared the policy of the State to adopt a systematic, comprehensive and ecological solid waste management program which shall:

- (a) Ensure the protection of the public health and environment;
- (b) Utilize environmentally-sound methods that maximize the utilization of valuable resources and encourage resource conservation and recovery;
- (c) Set guidelines and targets for solid waste avoidance and volume reduction through source reduction and waste minimization measures, including composting, recycling, re-use, recovery, green charcoal process, and others, before collection, treatment and disposal in appropriate and environmentally sound solid waste management facilities in accordance with ecologically sustainable development principles;
- (d) Ensure the proper segregation, collection, transport, storage, treatment and disposal of solid waste through the formulation and adoption of the best environmental practice in ecological waste management excluding incineration;
- (e) Promote national research and development programs for improved solid waste management and resource conservation techniques, more effective institutional arrangement and indigenous and improved methods of waste reduction, collection, separation and recovery;
- (f) Encourage greater private sector participation in solid waste management;
- (g) Retain primary enforcement and responsibility of solid waste management with local government units while establishing a cooperative effort among the national government, other local government units, non- government organizations, and the private sector;
- (h) Encourage cooperation and self-regulation among waste generators through the application of market-based instruments;
- (i) Institutionalize public participation in the development and implementation of national and local integrated, comprehensive, and ecological waste management programs; and

(j) Strengthen the integration of ecological solid waste management and resource conservation and recovery topics into the academic curricula of formal and non-formal education in order to promote environmental awareness and action among the citizenry.

Article 2 Definition of Terms

Sec. 3. *Definition of Terms.* - For the purposes of this Act:

(a) Agricultural waste shall refer to waste generated from planting or harvesting of crops, trimming or pruning of plants and wastes or run-off materials from farms or fields;

(b) Bulky wastes shall refer to waste materials which cannot be appropriately placed in separate containers because of either its bulky size, shape or other physical attributes. These include large worn-out or broken household, commercial, and industrial items such as furniture, lamps, bookcases, filing cabinets, and other similar items;

(c) Bureau shall refer to the Environmental Management Bureau;

(d) Buy-back center shall refer to a recycling center that purchases of otherwise accepts recyclable materials from the public for the purpose of recycling such materials;

(e) Collection shall refer to the act of removing solid waste from the source or from a communal storage point;

(f) Composting shall refer to the controlled decomposition of organic matter by micro-organisms, mainly bacteria and fungi, into a humus-like product;

(g) Consumer electronics shall refer to special waste that includes worn-out, broken, and other discarded items such as radios, stereos, and TV sets;

(h) Controlled dump shall refer to a disposal site at which solid waste is deposited in accordance with the minimum prescribed standards of site operation;

(i) Department shall refer to the Department of Environment and Natural Resources;

(j) Disposal shall refer to the discharge, deposit, dumping, spilling, leaking or placing of any solid waste into or in an land;

(k) Disposal site shall refer to a site where solid waste is finally discharged and deposited;

(l) Ecological solid waste management shall refer to the systematic administration of activities which provide for segregation at source, segregated transportation, storage, transfer, processing, treatment, and disposal of solid waste and all other waste management activities which do not harm the environment;

(m) Environmentally acceptable shall refer to the quality of being re-usable, biodegradable or compostable, recyclable and not toxic or hazardous to the environment;

(n) Generation shall refer to the act or process of producing solid waste;

(o) Generator shall refer to a person, natural or juridical, who last uses a material and makes it available for disposal or recycling;

(p) Hazardous waste shall refer to solid waste management or combination of solid waste which because of its quantity, concentration or physical, chemical or infectious characteristics may:

(1) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or

(2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed;

(q) Leachate shall refer to the liquid produced when waste undergo decomposition, and when water percolate through solid waste undergoing decomposition. It is contaminated liquid that contains dissolved and suspended materials;

(r) Materials recovery facility - includes a solid waste transfer station or sorting station, drop-off center, a composting facility, and a recycling facility;

(s) Municipal waste shall refer to wastes produced from activities within local government units which include a combination of domestic, commercial, institutional and industrial wastes and street litters;

(t) Open dump shall refer to a disposal area wherein the solid wastes are indiscriminately thrown or disposed of without due planning and consideration for environmental and Health standards;

(u) Opportunity to recycle shall refer to the act of providing a place for collecting source-separated recyclable material, located either at a disposal site or at another location more convenient to the population being served, and collection at least once a month of source-separated recyclable material from collection service customers and to providing a public education and promotion program that gives notice to each person of the opportunity to recycle and encourage source separation of recyclable material;

(v) Person(s) shall refer to any being, natural or judicial, susceptible of rights and obligations, or of being the subject of legal relations;

(w) Post-consumer material shall refer only to those materials or products generated by a business or consumer which have served their intended end use, and which have been separated or diverted from solid waste for the purpose of being collected, processed and used as a raw material in the manufacturing of recycled product, excluding materials and by-products generated from, and by-products generated from, and commonly used within an original manufacturing process, such as mill scrap;

(x) Receptacles shall refer to individual containers used for the source separation and the collection of recyclable materials;

(y) Recovered material shall refer to material and by products that have been recovered or diverted from solid waste for the purpose of being collected, processed and used as a raw material in the manufacture of a recycled product;

(z) Recyclable material shall refer to any waste material retrieved from the waste stream and free from contamination that can still be converted into suitable beneficial use or for other purposes, including, but not limited to, newspaper, ferrous scrap metal, non-ferrous scrap metal, used oil, corrugated cardboard, aluminum, glass, office paper, tin cans and other materials as may be determined by the Commission;

(aa) Recycled material shall refer to post-consumer material that has been recycled and returned to the economy;

(bb) Recycling shall refer to the treating of used or waste materials through a process of making them suitable for beneficial use and for other purposes, and includes any process by which solid waste materials are transformed into new products in such a manner that the original product may lose their identity, and which maybe used as raw materials for the production of other goods or services: *Provided*, That the collection, segregation and re-use of previously used packaging material shall be deemed recycling under this Act;

(cc) Resource conversation shall refer to the reduction of the amount of solid waste that are generated or the reduction of overall resource consumption, and utilization of recovered resources;

(dd) Resources recovery shall refer to the collection, extraction or recovery of recyclable materials from the waste stream for the purpose of recycling, generating energy or producing a product suitable for beneficial use: *Provided*, That such resource recovery facilities exclude incineration;

(ee) Re-use shall refer to the process of recovering materials intended for the same or different purpose without the alteration of physical and chemical characteristics;

(ff) Sanitary landfill shall refer to a waste disposal site designed, constructed, operated and maintained in a manner that exerts engineering control over significant potential environment impacts arising from the development and operation of the facility;

(gg) Schedule of Compliance shall refer to an enforceable sequence of actions or operations to be accomplished within a stipulated time frame leading to compliance with a limitation, prohibition or standard set forth in this Act or any rule of regulation issued pursuant thereto;

(hh) Secretary landfill shall refer to the Secretary of the Department of Environment and Natural Resources;

(ii) Segregation shall refer to a solid waste management practice of separating different materials found in solid waste in order to promote recycling and re-use of resources and to reduce the volume of waste for collection and disposal;

(jj) Segregation at source shall refer to a solid waste management practice of separating, at the point of origin, different materials found in solid waste in order to promote recycling and re-use of resources and to reduce the volume of waste for collection and disposal;

(kk) Solid waste shall refer to all discarded household, commercial waste, non-hazardous institutional and industrial waste, street sweepings, construction debris, agricultural waste, and other non-hazardous/non-toxic solid waste.

Unless specifically noted otherwise, the term “solid waste” as used in this Act shall not include:

(1) Waste identified or listed as hazardous waste of a solid, liquid, contained gaseous or semisolid form which may cause or contribute to an increase in mortality or in serious or incapacitating reversible illness, or acute/chronic effect on the health of persons and other organisms;

(2) Infectious waste from hospitals such as equipment, instruments, utensils, and fomites of a disposable nature from patients who are suspected to have or have been diagnosed as having communicable diseases and must therefore be isolated as required by public health agencies, laboratory wastes such as pathological specimens (i.e. all tissues, specimens of blood elements, excreta, and secretions obtained from patients or laboratory animals) and disposable fomites that may harbor or transmit pathogenic organisms, and surgical operating room pathologic materials from outpatient areas and emergency rooms; and

(3) Waste resulting from mining activities, including contaminated soil and debris.

(II) Solid waste management shall refer to the discipline associated with the control of generation, storage, collection, transfer and transport, processing, and disposal of solid wastes in a manner that is in accord with the best principles of public health, economics, engineering, conservation, aesthetics, and other environmental considerations, and that is also responsive to public attitudes;

(mm) Solid waste management facility shall refer to any resource recovery system or component thereof; any system, program, or facility for resource conservation; any facility for the collection, source separation, storage, transportation, transfer, processing, treatment, or disposal of solid waste;

(nn) Source reduction shall refer to the reduction of solid waste before it enters the solid waste stream by methods such as product design, materials substitution, materials re-use and packaging restrictions;

(oo) Source separation shall refer to the sorting of solid waste into some or all of its component parts at the point of generation;

(pp) Special wastes shall refer to household hazardous wastes such as paints, thinners, household batteries, lead-acid batteries, spray canisters and the like. These include wastes from residential and commercial sources that comprise of bulky wastes, consumer electronics, white goods, yard wastes that are collected separately, batteries, oil, and tires. These wastes are usually handled separately from other residential and commercial wastes;

(qq) Storage shall refer to the interim containment of solid wastes after generation and prior to collection for ultimate recovery or disposal;

(rr) Transfer stations shall refer to those facilities utilized to receive solid wastes, temporarily store, separate, convert, or otherwise process the materials in the solid wastes, or to transfer the solid wastes directly from smaller to larger vehicles for transport. This term does not include any of the following:

(1) a facility whose principal function is to receive, store, separate, convert or otherwise process in accordance with national minimum standards, manure;

(2) a facility, whose principal function is to receive, store, convert, or otherwise process wastes which have already been separated for re-use and are intended for disposals, and

(3) the operations premises of a duly licensed solid waste handling operator who is receives, stores, transfers, or otherwise processes wastes as an activity incidental to the conduct of a refuse collection and disposal business.

(ss) Waste diversion shall refer to activities which reduce or eliminate the amount of solid waste from waste disposal facilities;

(tt) White goods shall refer to large worn-out or broken household, commercial, and industrial appliances such as stoves, refrigerators, dishwashers, and clothes washers and dryers collected separately. White goods are usually dismantled for the recovery of specific materials (e.g., copper, aluminum, etc.);

(uu) Yard waste shall refer to wood, small or chipped branches, leaves, grass clippings, garden debris, vegetable residue that is recognized as part of a plant or vegetable and other materials identified by the Commission.

CHAPTER II INSTITUTIONAL MECHANISM

Sec. 4. *National Solid Waste Management Commission.* - There is hereby established a National Solid Waste Management Commission, hereinafter referred to as the Commission, under the Office of the President. The Commission shall be composed of fourteen (14) members from the government sector and three members from the private sector. The government sector shall be represented by the heads of the following agencies in their *ex officio* capacity:

- (1) Department of Environment and Natural Resources (DENR);
- (2) Department of the Interior and Local Government (DILG);
- (3) Department of Science and Technology (DOST);
- (4) Department of Public Works and Highways (DPWH);
- (5) Department of Health (DOH);
- (6) Department of Trade and Industry (DTI);
- (7) Department of Agriculture (DA);
- (8) Metro Manila Development Authority (MMDA);
- (9) League of provincial governors;
- (10) League of city mayors;
- (11) League of municipal mayors;
- (12) Association of barangay councils;
- (13) Technical Education and Skills Development Authority (TESDA); and
- (14) Philippine Information Agency.

The private sector shall be represented by the following:

- (a) A representative from non-government organizations (NGOs) whose principal purpose is to promote recycling and the protection of air and water quality;
- (b) A representative from the recycling industry; and
- (c) A representative from the manufacturing or packaging industry;

The Commission may, from time to time, call on any other concerned agencies or sectors as it may deem necessary: *Provided*, That representatives from the NGOs, recycling and manufacturing or packaging industries shall be nominated through a process designed by themselves and shall be appointed by the President for a term of three (3) years: *Provided, further*, That the Secretaries of the member agencies of the Commission shall formulate action plans for their respective agencies to complement the National Solid Waste Management Framework.

The Department Secretary and a private sector representative of the Commission shall serve as chairman and vice chairman, respectively. The private sector representatives of the Commission shall be appointed on the basis of their integrity, high degree of professionalism and having distinguished themselves in environmental and resource management. The members of the Commission shall serve and continue to hold office until their successors shall have been appointed and qualified. Should a member of the Commission fail to complete his/her term, the unexpired portion of the term. Finally, the members shall be entitled to reasonable traveling expenses and honoraria.

The Department, through the Environmental Management Bureau, shall provide secretariat support to the Commission. The Secretariat shall be headed by an executive director who shall be nominated by the members of the Commission and appointed by the chairman.

Sec. 5. Powers and Functions of the Commission. - The Commission shall oversee the implementation of solid waste management plans and prescribe policies to achieve the objectives of this Act. The Commission shall undertake the following activities:

- (a) Prepare the national solid waste management framework;
- (b) Approve local solid waste management plans in accordance with its rules and regulations;
- (c) Review and monitor the implementation of local solid waste management plans;
- (d) Coordinate the operation of local solid waste management boards in the provincial and city/municipal levels;
- (e) To the maximum extent feasible, utilizing existing resources, assist provincial, city and municipal solid waste management plans;
- (f) Develop a model provincial, city and municipal solid waste management plan that will establish prototypes of the content and format which provinces, cities and municipalities may use in meeting the requirements of the National Solid Waste Management Framework;
- (g) Adopt a program to provide technical and other capability building assistance and support to local government units in the development and implementation of source reduction programs;
- (h) Develop and implement a program to assist local government units in the identification of markets for materials that are diverted from disposal facilities through re-use, recycling, and composting, and other environment-friendly methods;
- (i) Develop a mechanism for the imposition of sanctions for the violations environmental rules and regulations;
- (j) Manage the Solid Waste Management Fund;

(k) Develop and prescribe procedures for the issuance of appropriate permits and clearances.

(l) Review the incentives scheme for effective solid waste management, for purpose of ensuring relevance and efficiency in achieving the objectives of this Act;

(m) Formulate the necessary education promotion and information campaign strategies;

(n) Establish, after notice and hearing of the parties concerned, standards, criteria, guidelines, and formula that are fair, equitable and reasonable, in establishing tipping charges and rates that the proponent will charge in the operation and management of solid waste management facilities and technologies.

(o) Develop safety nets and alternative livelihood programs for small recyclers and other sectors that will be affected as a result of the construction and/or operation of solid waste management recycling plant or facility.

(p) Formulate and update a list of non-environmentally acceptable materials in accordance with the provisions of this Act. For this purpose, it shall be necessary that proper consultation be conducted by the Commission with all concerned industries to ensure a list that is based on technological and economic viability.

(q) Encourage private sector initiatives, community participation and investments resource recovery-based livelihood programs for local communities.

(r) Encourage all local government agencies and all local government units to patronize products manufactured using recycled and recyclable materials;

(s) Propose and adopt regulations requiring the source separation and post separation collection, segregated collection, processing, marketing and sale of organic and designated recyclable material generated in each local government unit; and

(t) Study and review of the following:

(i) Standards, criteria and guidelines for promulgation and implementation of an integrated national solid waste management framework; and

(ii) Criteria and guidelines for siting, design, operation and maintenance of solid waste management facilities.

Sec. 6. *Meetings.* - The Commission shall meet at least once a month. The presence of at least a majority of the members shall constitute a quorum. The chairman, or in his absence the vice-chairman, shall be the presiding officer. In the absence of the heads of the agencies mentioned in Sec. 4 of this Act, they may designate permanent representatives to attend the meetings.

Sec. 7. *The National Ecology Center.* - There shall be established a National Ecology Center under the Commission which shall provide consulting, information, training, and networking services for the implementation of the provisions of this Act.

In this regard, it shall perform the following functions:

(a) Facilitate training and education in integrated ecological solid waste management;

(b) Establish and manage a solid waste management information data base, in coordination with the DTI and other concerned agencies:

(1) on solid waste generation and management techniques as well as the management, technical and operational approaches to resource recovery; and

(2) of processors/recyclers, the list of materials being recycled or bought by them and their respective prices;

(c) Promote the development of a recycling market through the establishment of a national recycling network that will enhance the opportunity to recycle;

(d) Provide or facilitate expert assistance in pilot modeling of solid waste management facilities; and

(e) Develop, test, and disseminate model waste minimization and reduction auditing procedures for evaluating options.

The National Ecology Center shall be headed by the director of the Bureau in his *ex officio* capacity. It shall maintain a multi-sectoral, multi-disciplinary pool of experts including those from the academe, inventors, practicing professionals, business and industry, youth, women and other concerned sectors, who shall be screened according to qualifications set by the Commission.

Sec. 8. *Role of the Department.* - For the furtherance of the objectives of this Act, the Department shall have the following functions:

(a) Chair the Commission created pursuant to this Act;

(b) Prepare an annual National Solid Waste Management Status Report;

(c) Prepare and distribute information, education and communication materials on solid waste management;

(d) Establish methods and other parameters for the measurement of waste reduction, collection and disposal;

(e) Provide technical and other capability building assistance and support to the LGUs in the development and implementation of local solid waste management plans and programs;

(f) Recommend policies to eliminate barriers to waste reduction programs;

(g) Exercise visitorial and enforcement powers to ensure strict compliance with this Act;

(h) Perform such other powers and functions necessary to achieve the objectives of this Act; and

(i) Issue rules and regulations to effectively implement the provisions of this Act.

Sec. 9. *Visitorial Powers of the Department.* - The Department or its duly authorized representative shall have access to, and the right to copy therefrom, the records required to be maintained pursuant to the provisions of this Act. The Secretary or the duly authorized representative shall likewise have the right to enter the premises of any generator, recycler or manufacturer, or other facilities any time to question any employee or investigate any fact, condition or matter which may be necessary to determine any violation, or which may aid in the effective enforcement of this Act and its implementing rules and regulations. This Section

shall not apply to private dwelling places unless the visitorial power is otherwise judicially authorized.

Sec. 10. *Role of LGUs in Solid Waste Management.* - Pursuant to the relevant provisions of R. A. No. 7160, otherwise known as the Local government code, the LGUs shall be primarily responsible for the implementation and enforcement of the provisions of this Act within their respective jurisdictions.

Segregation and collection of solid waste shall be conducted at the barangay level specifically for biodegradable, compostable and reusable wastes: *Provided*, That the collection of non-recyclable materials and special wastes shall be the responsibility of the municipality or city.

Sec. 11. *Provincial Solid Waste Management Board.* - A Provincial Solid Waste Management board shall be established in every province, to be chaired by the governor. Its members shall include:

- (a) All the mayors of its component cities and municipalities;
- (b) One (1) representative from the Sangguniang Panlalawigan to be represented by the chairperson of either the Committees on Environment or Health or their equivalent committees, to be nominated by the presiding officer;
- (c) The provincial health and/or general services officers, whichever may be recommended by the governor;
- (d) The provincial environment and natural resources officer;
- (e) The provincial engineer;
- (f) Congressional representatives from each congressional district within the province;
- (g) A representative from the NGO sector whose principal purpose is to promote recycling and the protection of air and water quality;
- (h) A representative from the recycling industry;
- (i) A representative from the manufacturing or packaging industry; and
- (j) A representative of each concerned government agency possessing relevant technical and marketing expertise as may be determined by the board.

The Provincial Solid Waste Management Board may, from time to time, call on any other concerned agencies or sectors as it may deem necessary: *Provided*, That representatives from the NGOs, recycling and manufacturing or packaging industries shall be selected through a process designed by themselves and shall be endorsed by the government agency of representatives of the Board: *Provided, further*, that in the Province of Palawan, the Board shall be chaired by the chairman of the Palawan Council for Sustainable Development, pursuant to Republic Act No. 7611.

In the case of Metro Manila, the Board shall be chaired by the chairperson of the MMDA and its members shall include:

- (i) all mayors of its component cities and municipalities;
- (ii) a representative from the NGO sector whose principal purpose is to promote recycling and the protection of air and water quality;

(iii) a representative from the recycling industry; and

(iv) a representative from the manufacturing or packaging industry.

The Board may, from time to time, call on any other concerned agencies or sectors as it may deem necessary: *Provided*, That representatives from the NGOs, recycling and manufacturing or packaging industries shall be selected through a process designed by themselves and shall be endorsed by the government agency representatives of the Board.

The Provincial Solid Waste Management Board shall have the following functions and responsibilities:

(1) Develop a provincial solid waste management plan from the submitted solid waste management plans of the respective city and municipal solid waste management boards herein created. It shall review and integrate the submitted plans of all its component cities and municipalities and ensure that the various plan complement each other, and have the requisite components. The Provincial Solid Waste Management Plan shall be submitted to the Commission for approval.

The Provincial Plans shall reflect the general program of action and initiatives of the provincial government and implementing a solid waste management program that would support the various initiatives of its component cities and municipalities.

(2) Provide the necessary logistical and operational support to its component cities and municipalities in consonance with subsection (f) of Sec.17 of the Local Government Code;

(3) Recommend measures and safeguards against pollution and for the preservation of the natural ecosystem;

(4) Recommend measures to generate resources, funding and implementation of project and activities as specified in the duly approved solid waste management plans;

(5) Identify areas within its jurisdiction which have common solid waste management problems and are appropriate units are planning local solid waste management services in accordance with Section 41 hereof;

(6) Coordinate the efforts of the component cities and municipalities in the implementation of the Provincial Solid Waste Management Plan;

(7) Develop an appropriate incentive scheme as an integral component of the Provincial Solid Waste Management Plan;

(8) Convene joint meetings of the provincial, city and municipal solid waste management boards at least every quarter for purposes of integrating, synchronizing, monitoring and evaluating the development and implementation of its provincial solid waste management plan;

(9) Represent any of its component city or municipality in coordinating its resource and operational requirements with agencies of the national government;

(10) Oversee the implementation of the Provincial Solid Waste Management Plan;

(11) Review every two (2) years or as the need arises the Provincial Solid Waste Management Plan for purposes of ensuring its sustainability, viability, effectiveness and relevance in relation to local and international development in the field of solid waste management; and

(12) Allow for the clustering of LGUs for the solution of common solid waste management problems.

Sec. 12. City and Municipal Solid Waste Management Board. - Each city or municipality shall form a City or Municipal Waste Management Board that shall prepare, submit and implement a plan for the safe and sanitary management of solid waste generated in areas under in geographic and political coverage.

The City or Municipal Solid Waste Management Board shall be composed of the city or municipal mayor as head with the following as members:

- a) One (1) representative of Sangguniang Panlungsod or the Sangguniang Bayan, preferably chairpersons of either the Committees on Environment or Health, who will be designated by the presiding officer;
- b) President of the Association of Barangay Councils in the municipality or city;
- c) Chairperson of the Sangguniang Kabataan Federation;
- d) A representative from NGOs whose principal purpose is to promote recycling and the protection of air and water quality;
- e) A representative from the recycling industry;
- f) A representative from the manufacturing or packaging industry; and
- g) A representative of each concerned government agency possessing relevant technical and marketing expertise as may be determined by the Board.

The City or Municipal Solid Waste Management Board may, from time to time, call on any concerned agencies or sectors as it may deem necessary: *Provided*, That representatives from NGOs, recycling and manufacturing or packaging industries shall be selected through a process designed by themselves and shall be endorsed by the government agency representatives of the Board.

The City and Municipal Solid Waste Management Boards shall have the following duties and responsibilities:

- (1) Develop the City or Municipal Solid Waste Management Plan that shall ensure the long-term management of solid waste, as well as integrate the various solid waste management plans and strategies of the barangays in its area of jurisdiction. In the development of the Solid Waste Management Plan, it shall conduct consultations with the various sectors of the community;
- (2) Adopt measures to promote and ensure the viability and effective implementation of solid waste management programs in its component barangays;
- (3) Monitor the implementation of the City or Municipal Solid Waste Management Plan through its various political subdivisions and in cooperation with the private sector and the NGOs;
- (4) Adopt specific revenue-generating measures to promote the viability of its Solid Waste Management Plan;
- (5) Convene regular meetings for purposes of planning and coordinating the implementation of the solid waste management plans of the respective component barangays;

(6) Oversee the implementation of the City or Municipal Solid Waste Management Plan;

(7) Review every two (2) years or as the need arises the City or Municipal Solid Waste Management Plan for purposes of ensuring its sustainability, viability, effectiveness and relevance in relation to local and international developments in the field of solid waste management;

(8) Develop the specific mechanics and guidelines for the implementation of the City or Municipal Solid Waste Management Plan;

(9) Recommended to appropriate local government authorities specific measures or proposals for franchise or build-operate-transfer agreements with duly recognized institutions, pursuant to R. A.6957, to provide either exclusive or non-exclusive authority for the collection, transfer, storage, processing, recycling or disposal of municipal solid waste. The proposals shall take into consideration appropriate government rules and regulations on contracts, franchise and build-operate-transfer agreements;

(10) Provide the necessary logistical and operational support to its component cities and municipalities in consonance with subsection (f) of Sec. 17 of the Local Government Code;

(11) Recommended measures and safeguards against pollution and for the preservation of the natural ecosystem; and

(12) Coordinates the efforts of its components barangays in the implementation of the city or municipal Solid Waste Management Plan.

Sec. 13. *Establishment of Multi-Purpose Environment Cooperatives or Association in Every LGU.* - Multi-purpose cooperatives and associations that shall undertake activities to promote the implementation and/ or directly undertake projects in compliance with the provisions of this Act shall be encouraged and promoted in every LGU.

CHAPTER III COMPREHENSIVE SOLID WASTE MANAGEMENT

Article 1 General Provisions

Sec. 14. *National Solid Waste Management Status Report.* - The Department, in coordination with the DOH and other concerned agencies, shall within six (6) months after the effectivity of this Act, prepare a National Solid Waste Management Status Report which shall be used as a basis in formulating the National Solid Waste Management Framework provided in Sec. 15 of this Act. The concerned agencies shall submit to the Department relevant data necessary for the completion of the said report within three (3) months following the effectivity of this Act. The said report shall include, but shall not be limited to, the following:

(a) Inventory of existing solid waste facilities;

(b) General waste characterization, taking into account the type, quantity of waste generated and estimation of volume and type of waste for reduction and recycling;

(c) Projection of waste generation;

(d) The varying regional geologic, hydrologic, climatic, and other factors vital in the implementation of solid waste practices to ensure the reasonable protection of:

(1) the quality of surface and groundwater from leachate contamination;

(2) the quality of surface waters from surface run-off contamination; and

(3) ambient air quality.

(e) Population density, distribution and projected growth;

(f) The political, economic, organizational, financial and management problems affecting comprehensive solid waste management;

(g) Systems and techniques of waste reduction, re-use and recycling;

(h) Available markets for recyclable materials;

(i) Estimated cost of collecting, storing, transporting, marketing and disposal of wastes and recyclable materials; and

(j) Pertinent qualitative and quantitative information concerning the extent of solid waste management problems and solid waste management activities undertaken by local government units and the waste generators: *Provided*, That the Department, in consultation with concerned agencies, shall review, update and publish a National Solid Waste Management Status Report every two (2) years or as the need arises.

Sec. 15. *National Solid Waste Management Framework.* - Within six (6) months from the completion of the national solid waste management status report under Sec. 14 of this Act, the Commission created under Sec. 4 of this Act shall, with public participation, formulate and implement a National Solid Waste Management Framework. Such framework shall consider and include:

(a) Analysis and evaluation of the current state, trends, projections of solid waste management on the national, provincial and municipal levels;

(b) Identification of critical solid waste facilities and local government units which will need closer monitoring and/or regulation;

(c) Characteristics and conditions of collection, storage, processing, disposal, operating methods, techniques and practices, location of facilities where such operating methods, techniques and practices are conducted, taking into account the nature of the waste;

(d) Waste diversion goal pursuant to Sec. 20 of this Act;

(e) Schedule for the closure and/or upgrading of open and controlled dumps pursuant to Sec. 37 of this Act;

(f) Methods of closing or upgrading open dumps for purposes of eliminating potential health hazards;

(g) The profile of sources, including industrial, commercial, domestic, and other sources;

(h) Practical applications of environmentally sound techniques of waste minimization such as, but not limited to, resource conservation, segregation at source, recycling, resource recovery, including waste-to-energy generation, re-use and composting;

(i) A technical and economic description of the level of performance that can be attained by various available solid waste management practices which provide for the protection of public health and the environment;

- (j) Appropriate solid waste facilities and conservation systems;
- (k) Recycling programs for the recyclable materials, such as but not limited to glass, paper, plastic and metal;
- (l) Venues for public participation from all sectors at all phases/stages of the waste management program/project;
- (m) Information and education campaign strategies;
- (n) A description of levels of performance and appropriate methods and degrees of control that provide, at the minimum, for protection of public health and welfare through:
 - (1) Protection of the quality of groundwater and surface waters from leachate and run-off contamination;
 - (2) Disease and epidemic prevention and control;
 - (3) Prevention and control of offensive odor; and
 - (4) Safety and aesthetics.
- (o) Minimum criteria to be used by the local government units to define ecological solid waste management practices. As much as practicable, such guidelines shall also include minimum information for use in deciding the adequate location, design and construction of facilities associated with solid waste management practices, including the consideration of regional, geographic, demographic and climatic factors; and
- (p) The method and procedure for the phaseout and the eventual closure within eighteen (18) months from the effectivity of this Act in case of existing open dumps and/or sanitary landfills located within an aquifer, groundwater reservoir or watershed area.

Sec. 16. Local Government Solid Waste Management Plans. - The province, city or municipality, through its local solid waste management boards, shall prepare its respective 10-year solid waste management plans consistent with the national solid waste management framework: *Provided*, That the waste management plan shall be for the re-use, recycling and composting of wastes generated in their respective jurisdictions: *Provided, further*, That the solid waste management plan of the LGU shall ensure the efficient management of solid waste generated within its jurisdiction. The plan shall place primary emphasis on implementation of all feasible re-use, recycling, and composting programs while identifying the amount of landfill and transformation capacity that will be needed for solid waste which cannot be re-used, recycled, or composted. The plan shall contain all the components provided in Sec. 17 of this Act and a timetable for the implementation of the solid waste management program in accordance with the National Framework and pursuant to the provisions of this Act: *Provided, finally*, That it shall be reviewed and updated every year by the provincial, city or municipal solid waste management board.

For LGUs which have considered solid waste management alternatives to comply with Sec. 37 of this Act, but are unable to utilize such alternatives, a timetable or schedule of compliance specifying the remedial measure and eventual compliance shall be included in the plan.

All local government solid waste management plans shall be subjected to the approval of the Commission. The plan shall be consistent with the national framework and in accordance with the provisions of this Act and of the policies set by the Commission; *Provided*, That in the

province of Palawan, the local government solid waste management plan shall be approved by the Palawan Council for Sustainable Development, pursuant to R. A. No. 7611.

Sec. 17. *The Components of the Local Government Solid Waste Management Plan.* - The solid waste management plan shall include, but not limited to, the following components:

(a) ***City or Municipal Profile*** - The plan shall indicate the following background information on the city or municipality and its component barangays, covering important highlights of the distinct geographic and other conditions:

(1) Estimated population of each barangay within the city or municipality and population project for a 10-year period;

(2) Illustration or map of the city/municipality, indicating locations of residential, commercial, and industrial centers, and agricultural area, as well as dump, landfills and other solid waste facilities. The illustration shall indicate as well, the proposed sites for disposal and other solid waste facilities;

(3) Estimated solid waste generation and projection by source, such as residential, market, commercial, industrial, construction/demolition, street waste, agricultural, agro-industrial, institutional, other waste; and

(4) Inventory of existing waste disposal and other solid waste facilities and capacities.

(b) ***Waste characterization*** - For the initial source reduction and recycling element of a local waste management plan, the LGU waste characterization component shall identify the constituent materials which comprise the solid waste generated within the jurisdiction of the LGU. The information shall be representative of the solid waste generated and disposed of within the area. The constituent materials shall be identified by volume, percentage in weight or its volumetric equivalent, material type, and source of generation which includes residential, commercial, industrial, governmental, or other materials. Future revisions of waste characterization studies shall identify the constituent materials which comprise the solid waste disposed of at permitted disposal facilities.

(c) ***Collection and Transfer*** - The plan shall take into account the geographic subdivisions to define the coverage of the solid waste collection area in every barangay. The barangay shall be responsible for ensuring that a 100% collection efficiency from residential, commercial, industrial and agricultural sources, where necessary within its area of coverage, is achieved. Toward this end, the plan shall define and identify the specific strategies and activities to be undertaken by its component barangays, taking into account the following concerns:

(1) Availability and provision of properly designed containers or receptacles in selected collection points for the temporary storage of solid waste while awaiting collection and transfer to processing sites or to final disposal sites;

(2) Segregation of different types of solid waste for re-use, recycling and composting;

(3) Hauling and transfer of solid waste from source or collection points to processing sites or final disposal sites;

(4) Issuance and enforcement of ordinances to effectively implement a collection system in the barangay; and

(5) Provision of properly trained officers and workers to handle solid waste disposal.

The plan shall define and specify the methods and systems for the transfer of solid waste from specific collection points to solid waste management facilities.

(d) *Processing* - The Plan shall define the methods and the facilities required to process the solid waste, including the use of intermediate treatment facilities for composting, recycling, conversion and other waste processing systems. Other appropriate waste processing technologies may also be considered provided that such technologies conform with internationally-acceptable and other standards set in other standards set in other laws and regulations.

(e) *Source reduction* - The source reduction component shall include a program and implementation schedule which shows the methods by which the LGU will, in combination with the recycling and composting components, reduce a sufficient amount of solid waste disposed of in accordance with the diversion requirements of Sec. 20.

The source reduction component shall describe the following:

- (1) strategies in reducing the volume of solid waste generated at source;
- (2) measures for implementing such strategies and the resources necessary to carry out such activities;
- (3) other appropriate waste reduction technologies that may also be considered, provided that such technologies conform with the standards set pursuant to this Act;
- (4) the types of wastes to be reduced pursuant to Sec. 15 of this Act;
- (5) the methods that the LGU will use to determine the categories of solid wastes to be diverted from disposal at a disposal facility through re-use, recycling and composting; and
- (6) new facilities and expansion of existing facilities which will be needed to implement re-use, recycling and composting.

The LGU source reduction component shall include the evaluation and identification of rate structures and fees for the purpose of reducing the amount of waste generated, an other source reduction strategies, including but not limited to, programs and economic incentives provided under Sec. 46 of this Act to reduce the use of non-recyclable materials, replace disposable materials and products with reusable materials and products, reduce packaging, and increase the efficiency of the use of paper, cardboard, glass, metal, and other materials. The waste reduction activities of the community shall also take into account, among others, local capability, economic viability, technical requirements, social concerns' disposition of residual waste and environmental impact: *Provided*, That, projection of future facilities needed and estimated cost shall be incorporated in the plan.

(f) *Recycling* - The recycling component shall include a program and implementation schedule which shows the methods by which the LGU shall, in combination with source reduction and composting components, reduce a sufficient amount of solid waste disposed of in accordance with the diversion requirements set in Sec .20.

The LGU recycling component shall describe the following:

- (1) The types of materials to be recycled under the programs;
- (2) The methods for determining the categories of solid wastes to be diverted from disposal at a disposal facility through recycling; and
- (3) New facilities and expansion of existing facilities needed to implement the recycling component.

The LGU recycling component shall described methods for developing the markets for recycled materials, including, but not limited to, an evaluation of the feasibility of procurement preferences for the purchase of recycled products. Each LGU may determine and grant a price preference to encourage the purchase of recycled products.

The five-year strategy for collecting, processing, marketing and selling the designated recyclable materials shall take into account persons engaged in the business of recycling or persons otherwise providing recycling services before the effectivity of this Act. Such strategy may be base upon the results of the waste composition analysis performed pursuant to this Section or information obtained in the course of past collection of solid waste by the local government unit, and may include recommendations with respect to increasing the number of materials designated for recycling pursuant to this Act.

The LGU recycling component shall evaluate industrial, commercial, residential, agricultural, governmental and other curbside, mobile, drop-off and buy-back recycling programs, manual and automated materials recovery facilities, zoning, building code changes and rate structures which encourage recycling of materials. The Solid Waste Management Plan shall indicate the specific measures to be undertaken to meet the waste diversion specified under Sec. 20 of this Act.

Recommended revisions to the building ordinances, requiring newly-constructed buildings and buildings undergoing specified alterations to contain storage space, devices or mechanisms that facilitate source separation and storage of designated recyclable materials to enable the local government unit to efficiently collect, process, market and sell the designated materials. Such recommendations shall include, but shall not be limited to separate chutes to facilitate source separation in multi-family dwellings, storage areas that conform to fire and safety code regulations, and specialized storage containers.

The Solid Waste Management Plan shall indicate the specific measures to be undertaken to meet the recycling goals pursuant to the objectives of this Act.

(g) *Composting* - The composting component shall include a program and implementation schedule which shows the methods by which the LGU shall, in combination with the source reduction and recycling components, reduce a sufficient amount of solid waste disposed of within its jurisdiction to comply with the diversion requirements of Sec. 20 hereof.

The LGU composting component shall describe the following:

- (1) The types of materials which will be composted under the programs;
- (2) The methods for determining the categories of solid wastes to be diverted from disposal at a disposal facility through composting; and

(3) New facilities, and expansion of existing facilities needed to implement the composting component.

The LGU composting component shall describe methods for developing the markets for composted materials, including, but not limited to, an evaluation of the feasibility of procurement preferences for the purchase of composted products. Each LGU may determine and grant a price preference to encourage the purchase of composted products.

(h) *Solid waste facility capacity and final disposal* - The solid waste facility component shall include, but shall not be limited to, a projection of the amount of disposal capacity needed to accommodate the solid waste generated, reduced by the following:

(1) Implementation of source reduction, recycling and composting programs required in this Section or through implementation of other waste diversion activities pursuant to Sec. 20 of this Act;

(2) Any permitted disposal facility which will be available during the 10-year planning period; and

(3) All disposal capacity which has been secured through an agreement with another LGU, or through an agreement with a solid waste enterprise.

The plan shall identify existing and proposed disposal sites and waste management facilities in the city or municipality or in other areas. The plan shall specify the strategies for the efficient disposal of waste through existing disposal facilities and the identification of prospective sites for future use. The selection and development of disposal sites shall be made on the basis of internationally accepted standards and on the guidelines set in Sec. 41 and 42 of this Act.

Strategies shall be included to improve said existing sites to reduce adverse impact on health and the environment, and to extent life span and capacity. The plan shall clearly define projections for future disposal site requirements and the estimated cost for these efforts.

Open dump sites shall not be allowed as final disposal sites. If an open dump site is existing within the city or municipality, the plan shall make provisions for its closure or eventual phase out within the period specified under the framework and pursuant to the provisions under Sec. 37 of this Act. As an alternative, sanitary landfill sites shall be developed and operated as a final disposal site for solid and, eventually, residual wastes of a municipality or city or a cluster of municipality and/or cities. Sanitary landfills shall be designed and operated in accordance with the guidelines set under Secs. 40 and 41 of this Act.

(i) *Education and public information* - The education and public information component shall describe how the LGU will educate and inform its citizens about the source reduction, recycling and composting programs.

The plan shall make provisions to ensure that information on waste collection services, solid waste management and related health and environmental concerns are widely disseminated among the public. This shall be undertaken through the print and broadcast media and other government agencies in the municipality. The DECS and the Commission on Higher Education shall ensure that waste management shall be incorporated in the curriculum of primary, secondary and college students.

(j) *Special Waste* - The special waste component shall include existing waste handling and disposal practices for special wastes or household hazardous wastes, and the

identification of current and proposed programs to ensure the proper handling, re-use, and long-term disposal of special wastes;

(k) *Resource requirement and funding* - The funding component includes identification and description of project costs, revenues, and revenue sources the LGU will use to implement all components of the LGU solid waste management plan;

The plan shall likewise indicate specific projects, activities, equipment and technological requirements for which outside sourcing of funds or materials may be necessary to carry out the specific components of the plan. It shall define the specific uses for its resource requirements and indicate its costs. The plan shall likewise indicate how the province, city or municipality intends to generate the funds for the acquisition of its resource requirements. It shall also indicate if certain resource requirements are being or will be sourced from fees, grants, donations, local funding and other means. This will serve as basis for the determination and assessment of incentives which may be extended to the province, city or municipality as provided for in Sec. 45 of this Act.

(l) *Privatization of solid waste management projects* - The plan shall likewise indicate specific measures to promote the participation of the private sector in the management of solid wastes, particularly in the generation and development of the essential technologies for solid waste management. Specific projects or component activities of the plan which may be offered as private sector investment activity shall be identified and promoted as such. Appropriate incentives for private sector involvement in solid waste management shall likewise be established and provided for in the plan, in consonance with Sec. 45 hereof and other existing laws, policies and regulations; and

(m) *Incentive programs* - A program providing for incentives, cash or otherwise, which shall encourage the participation of concerned sectors shall likewise be included in the plan.

Sec. 18. *Owner and Operator.* - Responsibility for compliance with the standards in this Act shall rest with the owner and/or operator. If specifically designated, the operator is considered to have primary responsibility for compliance; however, this does not relieve the owner of the duty to take all reasonable steps to assure compliance with these standards and any assigned conditions. When the title to a disposal is transferred to another person, the new owner shall be notified by the previous owner of the existence of these standards and of the conditions assigned to assure compliance.

Sec. 19. *Waste characterization.* - The Department in coordination with the LGUs, shall be responsible for the establishment of the guidelines for the accurate characterization of wastes including determination of whether or not wastes will be compatible with containment features and other wastes, and whether or not wastes are required to be managed as hazardous wastes under R. A. 6969, otherwise known as the Toxic Substance and Hazardous and Nuclear Wastes Control Act.

Sec. 20. *Establishing Mandatory Solid Waste Diversion.* - Each LGU plan shall include an implementation schedule which shows that within five (5) years after the effectivity of this Act, the LGU shall divert at least 25% of all solid waste from waste disposal facilities through re-use, recycling and composting activities and other resource recovery activities: *Provided, That the waste diversion goals shall be increased every three (3) years thereafter; Provided, further, That nothing in this Section prohibits a local government unit from implementing re-use, recycling, and composting activities designed to exceed the goal.*

Article 2 Segregation of Wastes

Sec. 21. *Mandatory Segregation of Solid Wastes.* - The LGUs shall evaluate alternative roles for the public and private sectors in providing collection services, type of collection system, or combination of systems, that best meet their needs: *Provided*, That segregation of wastes shall primarily be conducted at the source, to include household, institutional, industrial, commercial and agricultural sources: *Provided, further*; That wastes shall be segregated into the categories provided in Sec. 22 of this Act.

For premises containing six (6) or more residential units, the local government unit shall promulgate regulations requiring the owner or person in charge of such premises to:

(a) provide for the residents a designated area and containers in which to accumulate source separated recyclable materials to be collected by the municipality or private center; and

(b) notify the occupants of each buildings of the requirements of this Act and the regulations promulgated pursuant thereto.

Sec. 22. *Requirements for the Segregation and Storage of Solid Waste.* - The following shall be the minimum standards and requirements for segregation and storage of solid waste pending collection:

(a) There shall be a separate container for each type of waste from all sources: *Provided*, That in the case of bulky waste, it will suffice that the same be collected and placed in a separate designated area; and

(b) The solid waste container depending on its use shall be properly marked or identified for on-site collection as “compostable”, “non-recyclable”, “recyclable” or “special waste”, or any other classification as may be determined by the Commission.

Article 3 Collection and Transport of Solid Wastes

Sec. 23. *Requirements for Collection of Solid Wastes.* - The following shall be the minimum standards and requirements for the collection of solid waste:

(a) All collectors and other personnel directly dealing with collection of solid waste shall be equipped with personal protective equipment to protect them from the hazards of handling wastes;

(b) Necessary training shall be given to the collectors and personnel to ensure that the solid wastes are handled properly and in accordance with the guidelines pursuant to this Act; and

(c) Collection of solid waste shall be done in a manner which prevents damage to the container and spillage or scattering of solid waste within the collection vicinity.

Sec. 24. *Requirements for the Transport of Solid Waste.* - The use of separate collection schedules and/or separate trucks or haulers shall be required for specific types of wastes. Otherwise, vehicles used for the collection and transport of solid wastes shall have the appropriate compartments to facilitate efficient storing of sorted wastes while in transit.

Vehicles shall be designed to consider road size, condition and capacity to ensure the safe and efficient collection and transport of solid wastes.

The waste compartment shall have a cover to ensure the containment of solid wastes while in transit.

For the purpose of identification, vehicles shall bear the body number, the name, and the telephone number of the contractor/agency collecting solid waste.

Sec. 25. *Guidelines for Transfer Stations.* - Transfer stations shall be designed and operated for efficient waste handling capacity and in compliance with environmental standards and guidelines set pursuant to this Act and other regulations: *Provided, That* no waste shall be stored in such station beyond twenty-four (24) hours.

The siting of the transfer station shall consider the land use plan, proximity to collection area, and accessibility of haul routes to disposal facility. The design shall give primary consideration to size and space sufficiency in order to accommodate the waste for storage and vehicles for loading and unloading of wastes.

Article 4 Recycling Program

Sec. 26. *Inventory of Existing Markets for Recyclable Materials.* - The DTI shall within six (6) months from the effectivity of this Act and in cooperation with the Department, the DILG and other concerned agencies and sectors, publish a study of existing markets for processing and purchasing recyclable materials and the potential steps necessary to expand these markets. Such study shall include, but not be limited to, an inventory of existing markets for recyclable materials, product standards for recyclable and recycled materials, and a proposal, developed in conjunction with the appropriate agencies, to stimulate the demand for the production of products containing post consumer and recovered materials.

Sec. 27. *Requirement for Eco-Labeling.* - The DTI shall formulate and implement a coding system for packaging materials and products to facilitate waste and recycling and re-use.

Sec. 28. *Reclamation Programs and Buy-back Centers for Recyclables and Toxics.* - The National Ecology Center shall assist LGUs in establishing and implementing deposit or reclamation programs in coordination with manufacturers, recyclers and generators to provide separate collection systems or convenient drop-off locations for recyclable materials and particularly for separated toxic components of the waste stream like dry cell batteries and tires to ensure that they are not incinerated or disposed of in a landfill. Upon effectivity of this Act, toxic materials present in the waste stream should be separated at source, collected separately and further screened and sent to appropriate hazardous waste treatment and disposal plants, consistent with the provisions of R. A. No. 6969.

Sec. 29. *Non-Environmentally Acceptable Products.* - Within one (1) year from the effectivity of this Act, the Commission shall, after public notice and hearing, prepare a list of non-environmentally acceptable products as defined in this Act that shall be prohibited according to a schedule that shall be prepared by the Commission: *Provided, however, That* non-environmentally acceptable products shall not be prohibited unless the Commission first finds that there are alternatives available which are available to consumers at no more than ten percent (10%) greater cost than the disposable product.

Notwithstanding any other provisions to the contrary, this section shall not apply to:

(a) Packaging used at hospitals, nursing homes or other medical facilities; and

(b) Any packaging which is not environmentally acceptable, but for which there is no commercially available alternatives as determined by the Commission.

The Commission shall annually review and update the list of prohibited non-environmentally acceptable products.

Sec. 30. *Prohibition on the Use of Non-Environmentally Acceptable Packaging.* - No person owning, operating or conducting a commercial establishment in the country shall sell or convey at retail or possess with the intent to sell or convey at retail any products that are placed, wrapped or packaged in or on packaging which is not environmentally acceptable packaging: *Provided, That* the Commission shall determine a phaseout period after proper

consultation and hearing with the stakeholders or with the sectors concerned. The presence in the commercial establishment of non-environmentally acceptable packaging shall constitute a rebuttable presumption of intent to sell or convey the same at retail to customers.

Any person who is a manufacturer, broker or warehouse operator engaging in the distribution or transportation of commercial products within the country shall file a report with the concerned local government within one (1) year from the effectivity of this Act, and annually thereafter, a listing of any products in packaging which is not environmentally acceptable. The Commission shall prescribe the form of such report in its regulations.

A violation of this Section shall be sufficient grounds for the revocation, suspension, denial or non-renewal of any license for the establishment in which the violation occurs.

Sec. 31. *Recycling Market Development.* - The Commission together with the National Ecology Center, the DTI and the Department of Finance shall establish procedures, standards and strategies to market recyclable materials and develop the local market for recycle goods, including but not limited to:

- (a) measures providing economic incentives and assistance including loans and grants for the establishment of privately-owned facilities to manufacture finished products from post-consumer materials;
- (b) guarantees by the national and local governments to purchase a percentage of the output of the facility; and
- (c) maintaining a list of prospective buyers, establishing contact with prospective buyers and reviewing and making any necessary changes in collecting or processing the materials to improve their marketability.

In order to encourage establishments of new facilities to produce goods from post-consumer and recovered materials generated within local government units, and to conserve energy by reducing materials transportation, whenever appropriate, each local government unit may arranged for long-term contracts to purchase a substantial share of the product output of a proposed facility which will be based in the jurisdiction of the local government unit if such facility will manufacture such finished products form post-consumer and recovered materials.

Sec. 32. *Establishment of LGU Materials Recovery Facility.* - There shall be established a Materials Recovery Facility (MRF) in every barangay or cluster of barangays. The facility shall be established in a barangay-owned or -leased land or any suitable open space to be determined by the barangay through its Sanggunian. For this purpose, the barangay or cluster of barangays shall allocate a certain parcel of land for the MRF. The MRF shall receive mixed waste for final sorting, segregation, composting, and recycling. The resulting residual wastes shall be transferred to a long term storage or disposal facility or sanitary landfill.

Sec. 33. *Guidelines for Establishment of Materials Recovery Facility.* - Materials recovery facilities shall be designed to receive, sort, process and store compostable and recyclable material efficiently and in an environmentally sound manner. The facility shall address the following considerations:

- (a) The building and/or land layout and equipment must be designed to accommodate efficient and safe materials processing, movement, and storage; and
- (b) The building must be designed to allow efficient and safe external access and to accommodate internal flow.

Sec. 34. *Inventory of Markets of Composts.* - Within six (6) months after the effectivity of this Act, the DA shall publish an inventory of existing markets and demands for composts. Said inventory shall thereafter be updated and published annually: *Provided*, That the composting of agricultural wastes and other compostable materials, including but not limited to garden wastes, shall be encouraged.

Sec. 35. *Guidelines for Compost Quality.* - Compost products intended to be distributed commercially shall conform with the standards for organic fertilizers set by the DA. The DA shall assist the compost producers to ensure that the compost products conform to such standards.

Article 6 Waste Management Facilities

Sec. 36. *Inventory of Waste Disposal Facilities.* - Within six (6) months from the effectivity of this Act, the Department, in cooperation with the DOH, DILG and other concerned agencies, shall publish an inventory of all solid waste disposal facilities or sites in the country.

Sec. 37. *Prohibition Against the Use of Open Dumps for Solid Waste.* - No open dumps shall be established and operated, nor any practice or disposal of solid waste by any person, including LGUs, which constitutes the use of open dumps for solid wastes, be allowed after the effectivity of this Acts: *Provided*, That within three (3) years after the effectivity of this Act, every LGU shall convert its open dumps into controlled dumps, in accordance with the guidelines set in Sec. 41 of this Act: *Provided, further*, That no controlled dumps shall be allowed five (5) years following the effectivity of this Act.

Sec. 38. *Permit for Solid Waste Management Facility Construction and Expansion.* - No person shall commence operation, including site preparation and construction of a new solid waste management facility or the expansion of an existing facility until said person obtains an Environment Compliance Certificate (ECC) from the Department pursuant to P.D. 1586 and other permits and clearances from concerned agencies.

Sec. 39. *Guidelines for Controlled Dumps.* - The following shall be the minimum considerations for the establishments of controlled dumps:

- (a) Regular inert cover;
- (b) Surface water and peripheral site drainage control;
- (c) Provision for aerobic and anaerobic decomposition;
- (d) Restriction of waste deposition to small working areas;
- (e) Fence, including provisions for litter control;
- (f) Basic record-keeping;
- (g) Provision of maintained access road;
- (h) Controlled waste picking and trading;
- (i) Post-closure site cover and vegetation; and
- (j) Hydro geological siting.

Sec. 40. *Criteria for Siting a Sanitary Landfill.* - The following shall be the minimum criteria for the siting of sanitary landfills:

- (a) The site selected must be consistent with the overall land use plan of the LGU;
- (b) The site must be accessible from major roadways or thoroughfares;
- (c) The site should have an adequate quantity of earth cover material that is easily handled and compacted;
- (d) The site must be chosen with regard for the sensitivities of the community's residents;
- (e) The site must be located in an area where the landfill's operation will not detrimentally affect environmentally sensitive resources such as aquifer, groundwater reservoir or watershed area;
- (f) The site should be large enough to accommodate the community's wastes for a period of five (5) years during which people must internalize the value of environmentally sound and sustainable solid waste disposal;
- (g) The site chosen should facilitate developing a landfill that will satisfy budgetary constraints, including site development, operation for many years, closure, post-closure care and possible remediation costs;
- (h) Operating plans must include provisions for coordinating with recycling and resource recovery projects; and
- (i) Designation of a separate containment area for household hazardous wastes.

Sec. 41. *Criteria for Establishment of Sanitary Landfill.* - The following shall be the minimum criteria for the establishment of sanitary landfills:

- (a) Liners - a system of clay layers and/or geosynthetic membranes used to contain leachate and reduce or prevent contaminant flow to groundwater;
- (b) Leachate collection and treatment system - installation of pipes at the low areas of the liner to collect leachate for storage and eventual treatment and discharge;
- (c) Gas control and recovery system - a series of vertical wells or horizontal trenches containing permeable materials and perforated piping placed in the landfill to collect gas for treatment or productive use as an energy source;
- (d) Groundwater monitoring well system - wells placed at an appropriate location and depth for taking water that are representative of ground water quality;
- (e) Cover - two (2) forms of cover consisting of soil and geosynthetic materials to protect the waste from long-term contact with the environment:
 - (i) a daily cover placed over the waste at the close of each day's operations, and;
 - (ii) a final cover, or cap, which is the material placed over the completed landfill to control infiltration of water, gas emission to the atmosphere, and erosion.
- (f) Closure procedure with the objectives of establishing low maintenance cover systems and final cover that minimizes the infiltration of precipitation into the waste. Installation of the final cover must be completed within six (6) months of the last receipt of waste;

(g) Post-closure care procedure - During this period, the landfill owner shall be responsible for providing for the general upkeep of the landfill, maintaining all of the landfill's environmental protection features, operating monitoring equipment, remediating groundwater should it become contaminated and controlling landfill gas migration or emission.

Sec. 42. Operating Criteria for Sanitary Landfills. - In the operation of a sanitary land fill, each site operator shall maintain the following minimum operating equipment:

(a) Disposal site records of, but not limited to:

(1) Records of weights or volumes accepted in a form and manner approved by the Department. Such records shall be submitted to the Department upon request, accurate to within ten percent (10%) and adequate for overall planning purposes and forecasting the rate of site filling;

(2) Records of excavations which may affect the safe and proper operation of the site or cause damage to adjoining properties;

(3) Daily log book or file of the following information: fires, landslides, earthquake damage, unusual and sudden settlement, injury and property damage, accidents, explosions, receipts or rejection of unpermitted wastes, flooding and other unusual occurrences;

(4) Record of personnel training; and

(5) Copy of written notification to the Department, local health agency, and fire authority of names, addresses and telephone numbers of the operator or responsible party of the site;

(b) Water quality monitoring of surface and ground waters and effluent, and gas emissions;

(c) Documentation of approvals, determinations and other requirements by the Department;

(d) Signs:

(1) Each point of access from a public road shall be posted with an easily visible sign indicating the facility name and other pertinent information as required by the Department;

(2) If the site is open to the public, there shall be an easily visible sign at the primary entrance of the site indicating the name of the site operator, the operator's telephone number, and hours of operation; an easily visible sign at an appropriate point shall indicate the schedule of changes and the general types of materials which will either be accepted or not;

(3) If the site is open to the public, there shall be an easily visible road sign and/or traffic control measures which direct traffic to the active face and other areas where wastes or recyclable materials will be deposited; and

(4) Additional signs and/or measures may be required at a disposal site by the Department to protect personnel and public health and safety;

(e) Monitoring of quality of surface, ground and effluent waters, and gas emissions;

(f) The site shall be designed to discourage unauthorized access by persons and vehicles by using a perimeter barrier or topographic constraints. Areas within the site

where open storage, or piling of hazardous materials occurs shall be separately fenced or otherwise secured as determined by the Department. The Department may also require that other areas of the site be fenced to create an appropriate level of security;

(g) Roads within the permitted facility boundary shall be designed to minimize the generation of dust and the tracking of material onto adjacent public roads. Such roads shall be kept in safe condition and maintained such that vehicle access and unloading can be conducted during inclement weather;

(h) Sanitary facilities consisting of adequate number of toilets and handwashing facilities, shall be available to personnel at or in the immediate vicinity of the site;

(i) Safe and adequate drinking water supply for the site personnel shall be available;

(j) The site shall have communication facilities available to site personnel to allow quick response to emergencies;

(k) Where operations are conducted during hours of darkness, the site and/or equipment shall be equipped with adequate lighting as approved by the Department to ensure safety and to monitor the effectiveness of operations;

(l) Operating and maintenance personnel shall wear and use appropriate safety equipment as required by the Department;

(m) Personnel assigned to operate the site shall be adequately trained in subject pertinent to the site operation and maintenance, hazardous materials recognition and screening, and heavy equipment operations, with emphasis on safety, health, environmental controls and emergency procedures. A record of such training shall be placed in the operating record;

(n) The site operator shall provide adequate supervision of a sufficient number of qualified personnel to ensure proper operation of the site in compliance with all applicable laws, regulations, permit conditions and other requirements. The operator shall notify the Department and local health agency in writing of the names, addresses, and telephone number of the operator or responsible party. A copy of the written notification shall be placed in the operation record;

(o) Any disposal site open to the public shall have an attendant present during public operating hours or the site shall be inspected by the operator on a regularly scheduled basis, as determined by the Department;

(p) Unloading of solid wastes shall be confined to a small area as possible to accommodate the number of vehicles using the area without resulting in traffic, personnel, or public safety hazards. Waste materials shall normally be deposited at the toe of the fill, or as otherwise approved by the Department;

(q) Solid waste shall be spread and compacted in layers with repeated passages of the landfill equipment to minimize voids within the cell and maximize compaction. The loose layer shall not exceed a depth approximately two feet before compaction. Spreading and compacting shall be accomplished as rapidly as practicable, unless otherwise approved by the Department;

(r) Covered surfaces of the disposal area shall be graded to promote lateral runoff of precipitation and to prevent piling. Grades shall be established of sufficient slopes to account for future settlement of the fill surface. Other effective maintenance methods may be allowed by the Department; and

(s) Cover material or native material unsuitable for cover, stockpiled on the site for use or removal, shall be placed so as not to cause problems or interfere with unloading, spreading, compacting, access, safety drainage, or other operations.

Article 7 Local Government Solid Waste Management

Sec. 43. *Guidelines for Identification of Common Solid Waste Management Problems.* - For purposes of encouraging and facilitating the development of local government plans for solid waste management, the Commission shall, as soon as practicable but not later than six (6) months from the effectivity of this Act, publish guidelines for the identification of those areas which have common solid waste management problems and are appropriate units for clustered solid waste management services. The guidelines shall be based on the following:

- (a) the size and location of areas which should be included;
- (b) the volume of solid waste which would be generated;
- (c) the available means of coordinating local government planning between and among the LGUs and for the integration of such with the national plan; and
- (d) possible lifespan of the disposal facilities.

Sec. 44. *Establishment of Common Waste Treatment and Disposal Facilities.* - Pursuant to Sec. 33 of R. A. 7160, otherwise known as the Local Government Code, all provinces, cities, municipalities and barangays, through appropriate ordinances, are hereby mandated to consolidate, or coordinate their efforts, services, and resources for purposes of jointly addressing common solid waste management problems and/or establishing common waste disposal facilities.

The Department, the Commission and local solid waste management boards shall provide technical and marketing assistance to the LGUs.

CHAPTER IV INCENTIVES

Sec. 45. *Incentives.* - (a) Rewards, monetary or otherwise, shall be provided to individuals, private organizations and entitles, including non-government organizations, that have undertaken outstanding and innovative projects, technologies, processes and techniques or activities in re-use, recycling and reduction. Said rewards shall be sourced from the Fund herein created.

(b) An incentive scheme is hereby provided for the purpose of encouraging LGUs, enterprises, or private entities, including NGOs, to develop or undertake an effective solid waste management, or actively participate in any program geared towards the promotion thereof as provided for in this Act.

(1) *Fiscal Incentives.* - Consistent with the provisions of E. O. 226, otherwise known as the Omnibus Investments Code, the following tax incentives shall be granted:

- (a) ***Tax and Duty Exemption on Imported Capital Equipment and Vehicles*** - Within ten (10) years upon effectivity of this Act, LGUs, enterprises or private entities shall enjoy tax and duty free importation of machinery, equipment, vehicles and spare parts used for collection, transportation, segregation, recycling, re-use and composing of solid wastes: *Provided*, That the importation of such machinery, equipment, vehicle and spare parts shall comply with the following conditions:

- (i) They are not manufactured domestically in sufficient quantity, of comparable quality and at reasonable prices;
- (ii) They are reasonably needed and will be used actually, directly and exclusively for the above mentioned activities;
- (iii) The approval of the Board of Investment (BOI) of the DTI for the importation of such machinery, equipment, vehicle and spare parts.

Provided, further, That the sale, transfer or disposition of such machinery, equipment, vehicle and spare parts, without prior approval of the (BOI), within five (5) years from the date of acquisition shall be prohibited, otherwise, the LGU concerned, enterprise or private entities and the vendee, transferee, or assignee shall be solidarily liable to pay twice the amount of tax and duty exemption given it.

(b) *Tax Credit on Domestic Equipment* - Within ten (10) years from the effectivity of this Act, a tax credit equivalent to 50% of the value of the national internal revenue taxes and customs duties that would have been waived on the machinery, equipment, vehicle and spare parts, had these items been imported shall be given to enterprises, private entities, including NGOs, subject to the same conditions and prohibition cited in the preceding paragraph.

(c) *Tax and Duty Exemption of Donations, Legacies and Gift* - All legacies, gifts and donations to LGUs, enterprises or private entities, including NGOs, for the support and maintenance of the program for effective solid waste management shall be exempt from all internal revenue taxes and customs duties, and shall be deductible in full from the gross income of the donor for income tax purposes.

(2) *Non-Fiscal Incentives.* - LGUs, enterprises or private entities availing of tax incentives under this Act shall also be entitled to applicable non-fiscal incentives provided for under E. O. 226, otherwise known as the Omnibus Investments Code.

The Commission shall provide incentives to businesses and industries that are engaged in the recycling of wastes and which are registered with the Commission and have been issued ECCs in accordance with the guidelines established by the Commission. Such incentives shall include simplified procedures for the importation of equipment, spare parts, new materials, and supplies, and for the export of processed products.

(3) *Financial Assistance Program.* - Government financial institutions such as the Development Bank of the Philippines (DBP), Landbank of the Philippines (LBP), Government Service Insurance System (GSIS), and such other government institutions providing financial services shall, in accordance with and to the extent allowed by the enabling provisions of their respective charters or applicable laws, accord high priority to extend financial services to individuals, enterprises, or private entities engaged in solid waste management.

(4) *Extension of Grants to LGUs.* - Provinces, cities and municipalities whose solid waste management plans have been duly approved by the Commission or who have been commended by the Commission for adopting innovative solid waste management programs may be entitled to receive grants for the purpose of developing their technical capacities toward actively participating in the program for effectively and sustainable solid waste management.

(5) *Incentives to Host LGUs.* - Local government units who host common waste management facilities shall be entitled to incentives.

CHAPTER V
FINANCING SOLID WASTE MANAGEMENT

Sec. 46. *Solid Waste Management Fund.* - There is hereby created, as a special account in the National Treasury, a Solid Waste Management Fund to be administered by the Commission. Such fund shall be sourced from the following:

- (a) Fines and penalties imposed, proceeds of permits and licenses issued by the Department under this Act, donations, endowments, grants and contributions from domestic and foreign sources; and
- (b) Amounts specifically appropriated for the Fund under the annual General Appropriations Act;

The Fund shall be used to finance the following:

- (1) products, facilities, technologies and processes to enhance proper solid waste management;
- (2) awards and incentives;
- (3) research programs;
- (4) information, education, communication and monitoring activities;
- (5) technical assistance; and
- (6) capability building activities.

LGUs are entitled to avail of the Fund on the basis of their approved solid waste management plan. Specific criteria for the availment of the Fund shall be prepared by the Commission.

The fines collected under Section 49 shall be allocated to the LGU where the fined prohibited acts are committed in order to finance the solid waste management of said LGU. Such allocation shall be based on a sharing scheme between the Fund and the LGU concerned.

In no case, however, shall the Fund be used for the creation of positions or payment of salaries and wages.

Sec. 47. *Authority to Collect Solid Waste Management Fees.* - The local government unit shall impose fees in amounts sufficient to pay the costs of preparing, adopting, and implementing a solid waste management plan prepared pursuant to this Act. The fees shall be based on the following minimum factors:

- (a) types of solid waste;
- (b) amount/volume of waste; and
- (c) distance of the transfer station to the waste management facility.

The fees shall be used to pay the actual costs incurred by the LGU in collecting the local fees. In determining the amounts of the fees, an LGU shall include only those costs directly related to the adoption and implementation of the plan and the setting and collection of the local fees.

CHAPTER VI
PENAL PROVISIONS

Sec. 48. *Prohibited Acts.* - The following acts are prohibited:

- (1) Littering, throwing, dumping of waste matters in public places, such as roads, sidewalks, canals, esteros or parks, and establishment, or causing or permitting the same;**
- (2) Undertaking activities or operating, collecting or transporting equipment in violation of sanitation operation and other requirements or permits set forth in established pursuant;**
- (3) The open burning of solid waste;**
- (4) Causing or permitting the collection of non-segregated or unsorted wastes;**
- (5) Squatting in open dumps and landfills;**
- (6) Open dumping, burying of biodegradable or non-biodegradable materials in flood prone areas;**
- (7) Unauthorized removal of recyclable material intended for collection by authorized persons;**
- (8) The mixing of source-separated recyclable material with other solid waste in any vehicle, box, container or receptacle used in solid waste collection or disposal;**
- (9) Establishment or operation of open dumps as enjoined in this Act, or closure of said dumps in violation of Sec. 37;**
- (10) The manufacture, distribution or use of non-environmentally acceptable packaging materials;**
- (11) Importation of consumer products packaged in non-environmentally acceptable materials;**
- (12) Importation of toxic wastes misrepresented as “recyclable” or “with recyclable content”;**
- (13) Transport and dumplog in bulk of collected domestic, industrial, commercial, and institutional wastes in areas other than centers or facilities prescribe under this Act;**
- (14) Site preparation, construction, expansion or operation of waste management facilities without an Environmental Compliance Certificate required pursuant to Presidential Decree No. 1586 and this Act and not conforming with the land use plan of the LGU;**
- (15) The construction of any establishment within two hundred (200) meters from open dumps or controlled dumps, or sanitary landfill; and**
- (16) The construction or operation of landfills or any waste disposal facility on any aquifer, groundwater reservoir, or watershed area and or any portions thereof.**

Sec. 49. *Fines and Penalties.* - (a) Any person who violates Section 48 paragraph (1) shall, upon conviction, be punished with a fine of not less than Three hundred pesos (P300.00) but not more than One thousand pesos (P1,000.00) or render community service for not less than one (1) day to not more than fifteen (15) days to an LGU where such prohibited acts are committed, or both;

(b) Any person who violates Section 48, pars. (2) and (3), shall, upon conviction be punished with a fine of not less than Three hundred pesos (P300.00) but not more than One thousand pesos (P1,000.00) or imprisonment of not less than one (1) day but to not more than fifteen (15) days, or both;

(c) Any person who violates Section 48, pars. (4), (5), (6) and (7) shall, upon conviction, be punished with a fine of not less than One thousand pesos (P1,000.00) but not more than Three thousand pesos (P3,000.00) or imprisonment of not less than fifteen (15) day but to not more than six (6) months, or both;

(d) Any person who violates Section 48, pars (8), (9), (10) and (11) for the first time shall, upon conviction, pay a fine of Five hundred thousand pesos (P500,000.00) plus and amount not less than five percent (5%) but not more than ten percent (10%) of his net annual income during the previous year.

The additional penalty of imprisonment of a minimum period of one (1) year but not to exceed three (3) years at the discretion of the court, shall be imposed for second or subsequent violations of Section 48, pars. (9) and (10).

(e) Any person who violates Section 48, pars. (12) and (13) shall, upon conviction, be punished with a fine not less than Ten thousand pesos (P10,000.00) but not more than Two hundred thousand pesos (P200,000.00) or imprisonment of not less than thirty (30) days but not more than three (3) years, or both;

(f) Any person who violates Section 48, pars. (14), (15) and (16) shall, upon conviction, be punished with a fine not less than One hundred thousand pesos (P100,000.00) but not more than One million pesos (P1,000,000.00), or imprisonment not less than one (1) year but not more than six (6) years, or both.

If the offense is committed by a corporation, partnership, or other juridical identity duly recognized in accordance with the law, the chief executive officer, president, general manager, managing partner or such other officer-in-charge shall be liable for the commission of the offense penalized under this Act.

If the offender is an alien, he shall, after service of the sentence prescribed above, be deported without further administrative proceedings.

The fines herein prescribed shall be increased by at least ten (10%) percent every three years to compensate for inflation and to maintain the deterrent functions of such fines.

Sec. 50. *Administrative Sanctions.* - Local government officials and officials of government agencies concerned who fail to comply with and enforce rules and regulations promulgated relative to this Act shall be charged administratively in accordance with R. A. 7160 and other existing laws, rules and regulations.

CHAPTER VII MISCELLANEOUS PROVISIONS

Sec. 51. *Mandatory Public Hearings.* - Mandatory public hearings for national framework and local government solid waste management plans shall be undertaken by the Commission and the respective Boards in accordance with process to be formulated in the implementing rules and regulations.

Sec. 52. *Citizens Suits.* - For the purposes of enforcing the provisions of this Act or its implementing rules and regulations, any citizen may file an appropriate civil, criminal or administrative action in the proper courts/bodies against:

(a) Any person who violates or fails to comply with the provisions of this Act its implementing rules and regulations; or

(b) The Department or other implementing agencies with respect to orders, rules and regulations issued inconsistent with this Act; and/or

(c) Any public officer who willfully or grossly neglects the performance of an act specifically enjoined as a duty by this Act or its implementing rules and regulations; or abuses his authority in the performance of his duty; or, in any many improperly performs his duties under this Act or its implementing rules and regulations; *Provided, however,* That no suit can be filed until after thirty-day (30) notice has been given to the public officer and the alleged violator concerned and no appropriate action has been taken thereon.

The Court shall exempt such action from the payment of filing fees and statements likewise, upon *prima facie* showing of the non-enforcement or violation complained of, exempt the plaintiff from the filing of an injunction bond for the issuance of preliminary injunction.

In the event that the citizen should prevail, the Court shall award reasonable attorney's fees, moral damages and litigation costs as appropriate.

Sec. 53. Suits and Strategic Legal Action Against Public Participation (SLAPP) and the Enforcement of this Act. - Where a suit is brought against a person who filed an action as provided in Section 52 of this Act, or against any person, institution or government agency that implements this Act, it shall be the duty of the investigating prosecutor or the Court, as the case may be, to immediately make a determination not exceeding thirty (30) days whether said legal action has been filed to harass, vex, exert undue pressure or stifle such legal recourses of the person complaining of or enforcing the provisions of this Act. Upon determination thereof, evidence warranting the same, the Court shall dismiss the complaint and award the attorney's fees and double damages.

This provision shall also apply and benefit public officers who are sued for acts committed in their official capacity, there being no grave abuse of authority, and done in the course of enforcing this Act.

Sec. 54. Research on Solid Waste Management. - The Department after consultations with the cooperating agencies, shall encourage, cooperate with, and render financial and other assistance to appropriate government agencies and private agencies, institutions and individuals in the conduct and promotion researches, experiments, and other studies on solid waste management, particularly those relating to:

(a) adverse health effects of the release into the environment of materials present in solid wastes, and methods to eliminate said effects;

(b) the operation and financing of solid waste disposal programs;

(c) the planning, implementing and operation of resource recovery and resource conservation systems;

(d) the production of usable forms of recovered resources, including fuel from solid waste;

(e) the development and application of new and improved methods of collecting and disposing of solid waste and processing and recovering materials and energy from solid waste;

(f) improvements in land disposal practices for solid waste (including sludge); and

(g) development of new uses of recovered resources and identification of existing or potential markets of recovered resources.

In carrying out solid waste researches and studies, the Secretary of the Department or the authorized representative may make grants or enter into contracts with government agencies, non-government organizations and private persons.

Sec. 55. *Public Education and Information.* - The Commission shall, in coordination with DECS, TESDA, CHED, DILG and PIA, conduct a continuing education and information campaign on solid waste management, such education and information program shall:

(a) Aim to develop public awareness of the ill-effects of and the community based solutions to the solid waste problem;

(b) Concentrate on activities which are feasible and which will have the greatest impact on the solid waste problem of the country, like resource conservation and recovery, recycling, segregation at source, re-use, reduction, and composing of solid waste; and

(c) Encourage the general public, accredited NGOs and people's organizations to publicity endorse and patronize environmentally acceptable products and packaging materials.

Sec. 56. *Environmental Education in the Formal and Nonformal Sectors.* - The national government, through the DECS and in coordination with concerned government agencies, NGOs and private institutions, shall strengthen the integration of environmental concerns in school curricula at all levels, with particular emphasis on the theory and practice of waste management principles like waste minimization, specifically resource conservation and recovery, segregation at source, reduction, recycling, re-use, and composing, in order to promote environmental awareness and action among the citizenry.

Sec. 57. *Business and Industry Role.* - The Commission shall encourage commercial and industrial establishments, through appropriate incentives other than tax incentives to initiate, participate and invest in integrated ecological solid waste management projects to manufacture environment-friendly products, to introduce develop and adopt innovative processes that shall recycle and re-use materials, conserve raw materials and energy, reduce waste, and prevent pollution and to undertake community activities to promote and propagate effective solid waste management practices.

Sec. 58. *Appropriations.* - For the initial operating expenses of the Commission and the National Ecology Center as well as the expensed of the local government units to carry out the mandate of this Act, the amount of Twenty million pesos (P20,000,000.00) is hereby appropriated from the Organizational Adjustment Fund on the year this Act is approved. Thereafter, it shall submit to the Department of Budget and Management its proposed budget for inclusion in the General Appropriations Act.

Sec. 59. *Implementing Rules and Regulations (IRR).* - The Department, in coordination with the Committees on Environment and Ecology of the Senate and House of Representative, respectively, the representatives of the Leagues of Provinces, Cities, Municipalities and Barangay Councils, the MMDA and other concerned agencies, shall promulgate the implementing rules and regulations of this Act, within one (1) year after its enactment: *Provided*, That rules and regulations issued by other government agencies and instrumentalities for the prevention and/or abatement of the solid waste management problem not inconsistent with this Act shall supplement the rules and regulations issued by the Department, pursuant to the provisions of this Act.

The draft of the IRR shall be published and be the subject of public consultation with affected sectors. It shall be submitted to the Committee on Environment Ecology of the Senate and House of Representatives, respectively, for review before approved by the Secretary.

Sec. 60. *Joint Congressional Oversight Committee.* - There is hereby created a Joint Congressional Oversight Committee to monitor the implementation of the Act and to oversee the functions of the Commission. The Committee shall be composed of five (5) Senators and five (5) Representatives to be appointed by the Senate President and Speaker of the House of Representatives, respectively. The Oversight Committee shall be co-chaired by a Senator and a Representative designated by the Senate President and the Speaker of the House of Representatives, respectively.

Sec. 61. *Abolition of the Presidential Task Force On Waste Management and the Project Management Office on Solid Waste Management.* - The Presidential Task Force on Waste Management which was created by virtue of Memorandum Circular No. 39 dated November 2, 1987, as amended by Memorandum Circular No. 39A and 88 is hereby abolished.

Further, pursuant to Administrative Order No. 90 dated October 19, 1992, the Project Management Office on Solid Waste Management is likewise hereby abolished. Consequently their powers and functions shall be absorbed by the Commission pursuant to the provisions of this Act.

Sec. 62. *Transitory Provision.* - Pending the establishment of the framework under Sec. 15 hereof, plans under Sec. 16 and promulgation of the IRR under Sec. 59 of this Act, existing laws, regulations, programs and projects on solid waste management shall be enforced: *Provided*, That for specific undertaking, the same may be revised in the interim in accordance with the intentions of this Act.

Sec. 63. *Report to Congress.* - The Commission shall report to Congress not later than March 30 of every year following the approval of this Act, giving a detailed account of its accomplishments and progress on solid waste management during the year and make the necessary recommendations in areas where there is need for legislative action.

Sec. 64. *Separability Clause.* - If any provision of this Act or the application of such provision to any person or circumstances is declared unconstitutional, the remainder of the Act or the application of such provision to other persons or circumstances shall not be affected by such declaration.

Sec. 65. *Repealing Clause.* - All laws, decrees, issuances, rules and regulations or parts thereof inconsistent with the provisions of this Act are hereby repealed or modified accordingly.

Sec. 66. *Effectivity.* - This Act shall take effect fifteen (15) days after its publication in at least two (2) newspapers of general circulation.

Approved: January 26, 2001

REPUBLIC ACT NO. 8749

PHILIPPINE CLEAN AIR ACT OF 1999

Chapter 1
General Provisions
Article One
Basic Air Quality Policies

SECTION 1. *Short Title.* - This Act shall be known as the “*Philippine Clean Air Act of 1999.*”

SEC. 2. *Declaration of Principles.* - The State shall protect and advance the right of the people to a balanced and healthful ecology in accord with the rhythm and harmony of nature.

The State shall promote and protect the global environment to attain sustainable development while recognizing the primary responsibility of local government units to deal with environmental problems.

The State recognizes that the responsibility of cleaning the habitat and environment is primarily area-based.

The State also recognizes the principle that “*polluters must pay*”.

Finally, the State recognizes that a clean and healthy environment is for the good of all and should, therefore, be the concern of all.

SEC. 3. *Declaration of Policies.* - The State shall pursue a policy of balancing development and environmental protection. To achieve this end, the frame work for sustainable development shall be pursued. It shall be the policy of the State to:

[a] Formulate a holistic national program of air pollution management that shall be implemented by the government through proper delegation and effective coordination of functions and activities;

[b] Encourage cooperation and self-regulation among citizens and industries through the application of market-based instruments;

[c] Focus primarily on pollution prevention rather than on control and provide for a comprehensive management program for air pollution;

[d] Promote public information and education and to encourage the participation of an informed and active public in air quality planning and monitoring; and

[e] Formulate and enforce a system of accountability for short and long-term adverse environmental impact of a project, program or activity. This shall include the setting up of a funding or guarantee mechanism for clean-up and environmental rehabilitation and compensation for personal damages.

SEC. 4. *Recognition of Rights.* - Pursuant to the above-declared principles, the following rights of citizens are hereby sought to be recognized and the State shall seek to guarantee their enjoyment:

[a] The right to breathe clean air;

[b] The right to utilize and enjoy all natural resources according to the principles of sustainable development;

[c] The right to participate in the formulation, planning, implementation and monitoring of environmental policies and programs and in the decision-making process;

[d] The right to participate in the decision-making process concerning development policies, plans and programs projects or activities that may have adverse impact on the environment and public health;

[e] The right to be informed of the nature and extent of the potential hazard of any activity, undertaking or project and to be served timely notice of any significant rise in the level of pollution and the accidental or deliberate release into the atmosphere of harmful or hazardous substances;

[f] The right of access to public records which a citizen may need to exercise his or her rights effectively under this Act;

[g] The right to bring action in court or quasi-judicial bodies to enjoin all activities in violation of environmental laws and regulations, to compel the rehabilitation and cleanup of affected area, and to seek the imposition of penal sanctions against violators of environmental laws; and

[h] The right to bring action in court for compensation of personal damages resulting from the adverse environmental and public health impact of a project or activity.

Article Two Definition of Terms

SEC. 5. *Definitions.*- As used in this Act:

a) *“Air pollutant”* means any matter found in the atmosphere other than oxygen, nitrogen, water vapor, carbon dioxide, and the inert gases in their natural or normal concentrations, that is detrimental to health or the environment, which includes, but not limited to smoke, dust, soot, cinders, fly ash, solid particles of any kind, gases, fumes, chemical mists, steam and radioactive substances;

b) *“Air pollution”* means any alteration of the physical, chemical and biological properties of the atmospheric air, or any discharge thereto of any liquid, gaseous or solid substances that will or is likely to create or to render the air resources of the country harmful, detrimental, or injurious to public health, safety or welfare or which will adversely affect their utilization for domestic, commercial, industrial, agricultural, recreational, or other legitimate purposes;

c) *“Ambient air quality guideline values”* means the concentration of air over specified periods classified as short-term and long-term which are intended to serve as goals or objectives for the protection of health and/or public welfare. These values shall be used for air quality management purposes such as determining time trends, evaluating stages of deterioration or enhancement of the air quality, and in general, used as basis for taking positive action in preventing, controlling, or abating air pollution;

d) *“Ambient air quality”* means the general amount of pollution present in a broad area; and refers to the atmosphere’s average purity as distinguished from discharge measurements taken at the source of pollution;

e) *“Certificate of Conformity”* means a certificate issued by the Department of Environment and Natural Resources to a vehicle manufacturer / assembler or importer

certifying that a particular new vehicle or vehicle type meets the requirements provided under this Act and its rules and regulations;

f) *“Department”* means the Department of Environment and Natural Resources;

g) *“Eco-profile”* means the geographic-based instrument for planners and decision makers which present an evaluation of the environment quality and carrying capacity of an area. It is the result of the integration of primary data and information on natural resources and antropogenic activities on the land which were evaluated by various environmental risk assessment and forecasting methodologies that enable the Department to anticipate the type of development control necessary in the planning area.

h) *“Emission”* means any air contaminant, pollutant, gas stream or unwanted sound from a known source which is passed into the atmosphere;

i) *“Greenhouse gases”* means those gases that can potentially or can reasonably be expected to induce global warming, which include carbon dioxide, oxides of nitrogen, chloroflourocarbons, and the like;

j) *“Hazardous substances”* means those substances which present either: (1) short-term acute hazards such as acute toxicity by ingestion, inhalation, or skin absorption, corrosivity or other skin or eye contact hazard or the risk of fire explosion; or (2) long-term toxicity upon repeated exposure, carcinogenicity (which in some cases result in acute exposure but with a long latent period), resistance to detoxification process such as biodegradation, the potential to pollute underground or surface waters;

k) *“Infectious waste”* means that portion of medical waste that could transmit an infectious disease;

l) *“Medical waste”* means the materials generated as a result of patient diagnosis, treatment, or immunization of human beings or animals;

m) *“Mobile source”* means any vehicle propelled by or through combustion of carbon-based or other fuel, constructed and operated principally for the conveyance of persons or the transportation of property goods;

n) *“Motor vehicle”* means any vehicle propelled by a gasoline or diesel engine or by any means other than human or animal power, constructed and operated principally for the conveyance of persons or the transportation of property or goods in a public highway or street open to public use;

o) *“Municipal waste”* means the waste materials generated from communities within a specific locality;

p) *“New vehicle”* means a vehicle constructed entirely from new parts that has never been sold or registered with the DOTC or with the appropriate agency or authority, and operated on the highways of the Philippines, any foreign state or country;

q) *“Octane Rating or the Anti-Knock Index(AKI)”* means the rating of the anti-knock characteristics of a grade or type of automotive gasoline as determined by dividing by two (2) the sum of the Research Octane Number (RON), plus the Motor Octane Number (MON); the octane requirement, with respect to automotive gasoline for use in a motor vehicle or a class thereof, whether imported, manufactured, or assembled by a manufacturer, shall refer to the minimum octane rating of such automotive gasoline which such manufacturer recommends for the efficient operation of such motor vehicle, or a substantial portion of such class, without knocking;

r) ***“Ozone Depleting Substances (ODS)”*** means those substances that significantly deplete or otherwise modify the ozone layer in a manner that is likely to result in adverse effects of human health and the environment such as, but not limited to, chloroflourocarbons, halons and the like;

s) ***“Persistent Organic Pollutants (POPs)”*** means the organic compounds that persist in the environment, bioaccumulate through the food web, and pose a risk of causing adverse effects to human health and the environment. These compounds resist photolytic, chemical and biological degradation, which shall include but not be limited to dioxin, furan, Polychlorinated Biphenyls (PCBs), organochlorine pesticides, such as aldrin, dieldrin, DDT, hexachlorobenzene, lindane, toxaphene and chlordane;

t) ***“Poisonous and toxic fumes”*** means any emissions and fumes which are beyond internationally - accepted standards, including but not limited to the World Health Organization (WHO) guideline values;

u) ***“Pollution control device”*** means any device or apparatus used to prevent, control or abate the pollution of air caused by emissions from identified pollution sources at levels within the air pollution control standards established by the Department;

v) ***“Pollution control technology”*** means the pollution control devices, production process, fuel combustion processes or other means that effectively prevent or reduce emissions or effluent;

w) ***“Standard of performance”*** means a standard for emissions of air pollutant which reflects the degree of emission limitation achievable through the application of the best system of emission reduction, taking into account the cost of achieving such reduction and any non-air quality health and environmental impact and energy requirement which the Department determines, and adequately demonstrates; and

x) ***“Stationary source”*** means any building or immobile structure, facility or installation which emits or may emit any air pollutant.

Chapter 2
Air Quality Management System
Article One
General Provisions

SEC. 6. *Air Quality Monitoring and Information Network.*- The Department shall prepare an annual National Air Quality Status Report which shall be used as the basis in formulating the Integrated Air Quality Improvement Framework, as provided for in Sec. 7. The said report shall include, but shall not be limited to the following:

- a) Extent of pollution in the country, per type of pollutant and per type of source, based on reports of the Department's monitoring stations;
- b) Analysis and evaluation of the current state, trends and projections of air pollution at the various levels provided herein;
- c) Identification of critical areas, activities, or projects which will need closer monitoring or regulation;
- d) Recommendations for necessary executive and legislative action; and

- e) Other pertinent qualitative and quantitative information concerning the extent of air pollution and the air quality performance rating of industries in the country.

The Department, in cooperation with the National Statistical Coordination Board (NSCB), shall design and develop an information network for data storage, retrieval and exchange.

The Department shall serve as the central depository of all data and information related to air quality.

SEC. 7. *Integrated Air Quality Improvement Framework.*- The Department shall within six (6) months after the effectivity of this Act, establish, with the participation of LGUs, NGOs, POs, the academe and other concerned entities from the private sector, formulate and implement the Integrated Air Quality Improvement Framework for a comprehensive air pollution management and control program. The framework shall, among others, prescribe the emission reduction goals using permissible standards, control strategies and control measures to undertaken within a specified time period, including cost-effective use of economic incentives, management strategies, collective actions, and environmental education and information.

The Integrated Air Quality Improvement Framework shall be adopted as the official blueprint with which all government agencies must comply with to attain and maintain ambient air quality standards.

SEC. 8. *Air Quality Control Action Plan.*- Within six (6) months after the formulation of the framework, the Department shall, with public participation, formulate and implement an air quality control action plan consistent with Sec. 7 of this Act. The action plan shall:

- a) Include enforceable emission limitations and other control measures, means or techniques, as well as schedules and time tables for compliance, as may be necessary or appropriate to meet the applicable requirements of this Act;
- b) Provide for the establishment and operation of appropriate devices, methods, systems and procedures necessary to monitor, compile and analyze data on ambient air quality;
- c) Include a program to provide for the following: (1) enforcement of the measures described in subparagraph [a]; (2) regulation of the modification and construction of any stationary source within the areas covered by the plan, in accordance with land use policy to ensure that ambient air quality standards are achieved;
- d) Contain adequate provisions, consistent with the provisions of this Act, prohibiting any source or other types of emissions activity within the country from emitting any air pollutant in amounts which will significantly contribute to the non-attainment or will interfere with the maintenance by the Department of any such ambient air quality standard required to be included in the implementation plan to prevent significant deterioration of air quality or to protect visibility;
- e) Include control strategies and control measures to be undertaken within a specified time period, including cost effective use of economic incentives, management strategies, collection action and environmental education and information;
- f) Designate airsheds; and

g) All other measures necessary for the effective control and abatement of air pollution.

The adoption of the plan shall clarify the legal effects on the financial, manpower and budgetary resources of the affected government agencies, and on the alignment of their programs with the plans.

In addition to direct regulations, the plan shall be characterized by a participatory approach to the pollution problem. The involvement of private entities in the monitoring and testing of emissions from mobile and/or stationary sources shall be considered.

Likewise, the LGU's, with the assistance from the Department, shall prepare and develop an action plan consistent with the Integrated Air Quality Improvement Framework to attain and maintain the ambient air quality standards within their respective airsheds as provided in Sec. 9 hereof.

The local government units shall develop and submit to the Department a procedure for carrying out the action plan for their jurisdiction. The Department, however, shall maintain its authority to independently inspect the enforcement procedure adopted. The Department shall have the power to closely supervise all or parts of the air quality action plan until such time the local government unit concerned can assume the function to enforce the standards set by the Department.

A multi-sectoral monitoring team with broad public representation shall be convened by the Department for each LGU to conduct periodic inspections of air pollution sources to assess compliance with emission limitations contained in their permits.

SEC. 9. *Airsheds*.- Pursuant to Sec. 8 of this Act, the designation of airsheds shall be on the basis of, but not limited to, areas with similar climate, meteorology and topology which affect the interchange and diffusion of pollutants in the atmosphere, or areas which share common interest or face similar development programs, prospects or problems.

For a more effective air quality management, a system of planning and coordination shall be established and a common action plan shall be formulated for each airshed.

To effectively carry out the formulated action plans, a Governing Board is hereby created, hereinafter referred to as the Board.

The Board shall be headed by the Secretary of the Department of Environment and Natural Resources as chairman. The members shall be as follows:

- a) Provincial Governors from areas belonging to the airshed;**
- b) City/Municipal Mayors from areas belonging to the airshed;**
- c) A representative from each concerned government agency;**
- d) Representatives from people's organizations;**
- e) Representatives from non-government organizations; and**
- f) Representatives from the private sector.**

The Board shall perform the following functions:

- a) Formulation of policies;**

- b) Preparation of a common action plan;
- c) Coordination of functions among its members; and
- d) Submission and publication of an annual Air Quality Status Report for each airshed.

Upon consultation with appropriate local government authorities, the Department shall, from time to time, revise the designation of airsheds utilizing eco-profiling techniques and undertaking scientific studies.

Emissions trading may be allowed among pollution sources within an airshed.

SEC. 10. *Management of Non-attainment Areas.*- The Department shall designate areas where specific pollutants have already exceeded ambient standards as non-attainment areas. The Department shall prepare and implement a program that will prohibit new sources of exceeded air pollutant without a corresponding reduction in existing resources.

In coordination with other appropriate government agencies, the LGUs shall prepare and implement a program and other measures including relocation, whenever necessary, to protect the health and welfare of residents in the area.

For those designated as nonattainment areas, the Department, after consultation with local government authorities, nongovernment organizations (NGOs), people's organizations (POs) and concerned sectors may revise the designation of such areas and expand its coverage to cover larger areas depending on the condition of the areas.

SEC. 11. *Air Quality Control Techniques.*- Simultaneous with the issuance of the guideline values and standards, the Department, through the research and development program contained in this Act and upon consultation with appropriate advisory committees, government agencies and LGUs, shall issue, and from time to time, revise information on air pollution control techniques.

Such information shall include:

- a) Best available technology and alternative methods of prevention, management and control of air pollution;
- b) Best available technology economically achievable which shall refer to the technological basis/standards for emission limits applicable to existing, direct industrial emitters of nonconventional and toxic pollutants; and
- c) Alternative fuels, processes and operating methods which will result in the eliminator or significant reduction of emissions.

Such information may also include data relating to the cost of installation and operation, energy requirements, emission reduction benefits, and environmental impact or the emission control technology.

The issuance of air quality guideline values, standards and information on air quality control techniques shall be made available to the general public: Provided, That the issuance of information on air quality control techniques shall not be construed as requiring the purchase of certain pollution control devices by the public.

SEC. 12. Ambient Air Quality Guideline Values and Standards.- The Department, in coordination with other concerned agencies, shall review and or revise and publish annually a list of hazardous air pollutants with corresponding ambient guideline values and/or standard necessary to protect health and safety, and general welfare. The initial list and values of the hazardous air pollutants shall be as follows:

a) For National Ambient Air Quality Guideline for Criteria Pollutants:

| Pollutants | Short Term ^a | | | Long Term ^b | | |
|--|-------------------------|--------|-----------------------|------------------------|------|---------------------|
| | µg/Ncm | ppm | Averaging Time | µg/Ncm | ppm | Averaging Time |
| Suspended Particulate Matter ^c -TSP | 230 ^d | | 24 hours | 90 | ---- | 1 year ^e |
| -PM-10 | 150 ^f | | 24 hours | 60 | ---- | 1 year ^e |
| Sulfur Dioxide ^c | 180 | 0.07 | 24 hours | 80 | 0.03 | 1 year |
| Nitrogen Dioxide | 150 | 0.08 | 24 hours | ---- | ---- | ---- |
| Photochemical Oxidants | 140 | 0.07 | 1 hour | ---- | ---- | ---- |
| As Ozone | 60 | 0.03 | 8 hours | ---- | ---- | ---- |
| Carbon Monoxide 35 | 30 | 1 hour | ---- | ---- | ---- | ---- |
| | mg/Ncm | | | | | |
| | 10 | 9 | 8 hours | ---- | ---- | ---- |
| | mg/Ncm | | | | | |
| Lead ^g | 1.5 | ---- | 3 months ^g | 1.0 | ---- | 1 year |

^a Maximum limits represented by ninety-eight percentile (98%) values not to be exceed more than once a year.

^b Arithmetic mean

^c SO₂ and Suspended Particulate matter are sampled once every six days when using the manual methods. A minimum of twelve sampling days per quarter of forty-eight sampling days each year is required for these methods. Daily sampling may be done in the future once continuous analyzers are procured and become available.

^d Limits for Total Suspended Particulate Matter with mass median diameter less than 25-50 µm.

^e Annual Geometric Mean

^f Provisional limits for Suspended Particulate Matter with mass median diameter less than 10 microns and below until sufficient monitoring data are gathered to base a proper guideline.

^g Evaluation of this guideline is carried out for 24-hour averaging time and averaged over three moving calendar months. The monitored average value for any three months shall not exceed the guideline value.

b) For National Ambient Air Quality Standards for Source Specific Air Pollutants from:
Industrial Sources/ Operations:

| Pollutants ¹ | Concentration ² | | Averaging time (min.) | Method of Analysis/ Measurement ³ |
|---|----------------------------|---------------|--------------------------|--|
| | µ/Ncm | ppm | | |
| 1. Ammonia | 200 | 0.28 | 30 | Nesselerization/ Indo Phenol |
| 2. Carbon Disulfide | 30 | 0.01 | 30 | Tischer Method |
| 3. Chlorine and Chlorine Compounds expressed as Cl ² | 100 | 0.03 | 5 | Methyl Orange |
| 4. Formaldehyde | 50 | 0.04 | 30 | Chromotropic acid Method or MBTH Colorimetric Method |
| 5. Hydrogen Chloride | 200 | 0.13 | 30 | Volhard Titration with Iodine Solution |
| 6. Hydrogen Sulfide | 100 | 0.07 | 30 | Methylene Blue |
| 7. Lead | 20 | | 30 | AAS ^c |
| 8. Nitrogen Dioxide | 375,260 | 0.20,0.14 | 30,60 | Greiss- Saltzman |
| 9. Phenol | 100 | 0.03 | 30 | 4-Aminoantiphrine |
| 10. Sulfur Dioxide | 470, 340 | 0.18, 0.13 | 30,60 | Colorimetric-Pararosaniline |
| 11. Suspended Particulate Matter-TSP | 300 | ---- | 60 | Gravimetric |

¹ Pertinent ambient standards for Antimony, Arsenic, Cadmium, Asbestos, Nitric Acid and Sulfuric Acid Mists in the 1978 NPCC Rules and Regulations may be considered as guides in determining compliance.

² Ninety-eight percentile (98%) values of 30-minute sampling measured at 25°C and one atmosphere pressure.

³ Other equivalent methods approved by the Department may be used.

The basis in setting up the ambient air quality guideline values and standards shall reflect, among others, the latest scientific knowledge including information on:

a) Variable, including atmospheric conditions, which of themselves or in combination with other factors may alter the effects on public health or welfare of such air pollutant;

b) The other types of air pollutants which may interact with such pollutant to produce an adverse effect on public health or welfare; and

c) The kind and extent of all identifiable effects on public health or welfare which may be expected from presence of such pollutant in the ambient air, in varying quantities.

The Department shall base such ambient air quality standards on World Health Organization (WHO) standards, but shall not be limited to nor be less stringent than such standards.

SEC. 13. Emission Charge System.- The Department, in case of industrial dischargers, and the Department of Transportation and Communication (DOTC), in case of motor vehicle dischargers, shall, based on environmental techniques, design, impose on and collect regular emission fees from said dischargers as part of the emission permitting system or vehicle registration renewal system, as the case may be. The system shall encourage the industries and motor vehicles to abate, reduce, or prevent pollution. The basis of the fees include, but is

not limited to, the volume and toxicity of any emitted pollutant. Industries, which shall install pollution control devices or retrofit their existing facilities with mechanisms that reduce pollution shall be entitled to tax incentives such as but not limited total credits and/or accelerated depreciation deductions.

SEC. 14. *Air Quality Management Fund.*- An Air Quality Management Fund to be administered by the Department as a special account in the National Treasury is hereby established to finance containment, removal, and clean-up operations of the Government in air pollution cases, guarantee restoration of ecosystems and rehabilitate areas affected by the acts of violators of this Act, to support research, enforcement and monitoring activities and capabilities of the relevant agencies, as well as to provide technical assistance to the relevant agencies. Such fund may likewise be allocated per airshed for the undertakings herein stated.

The Fund shall be sourced from the fines imposed and damages awarded to the Republic of the Philippines by the Pollution Adjudication Board (PAB), proceeds of licenses and permits issued by the Department under this Act, emission fees and from donations, endowments and grants in the forms of contributions. Contributions to the Fund shall be exempted from donor taxes and all other taxes, charges or fees imposed by the Government.

SEC. 15. *Air Pollution Research and Development Program.*- The Department, in coordination with the Department of Science and Technology (DOST), other agencies, the private sector, the academe, NGO's and PO's, shall establish a National Research and Development Program for the prevention and control of air pollution. The Department shall give special emphasis to research on and the development of improved methods having industry-wide application for the prevention and control of air pollution.

Such a research and development program shall develop air quality guideline values and standards in addition to internationally-accepted standards. It shall also consider the socio-cultural, political and economic implications of air quality management and pollution control.

Article Two Air Pollution Clearances and Permits for Stationary Sources

SEC. 16. *Permits.*- Consistent with the provisions of this Act, the Department shall have the authority to issue permits as it may determine necessary for the prevention and abatement of air pollution.

Said permits shall cover emission limitations for the regulated air pollutants to help attain and maintain the ambient air quality standards. These permits shall serve as management tools for the LGUs in the development of their action plan.

SEC. 17. *Emission Quotas.*- The Department may allow each regional industrial center that is designated as special airshed to allocate emission quotas to pollution sources within its jurisdiction that qualify under an environmental impact assessment system programmatic compliance program pursuant to the implementing rules and regulations of Presidential Decree No. 1586.

SEC. 18. *Financial Liability for Environmental Rehabilitation.*- As part of the environmental management plan attached to the environmental compliance certificate pursuant to Presidential Decree No. 1586 and rules and regulations set therefor, the Department shall require program and project proponents to put up financial guarantee mechanisms to finance the needs for emergency response, clean-up rehabilitation of areas that may be damaged during the program or project's actual implementation. Liability for damages shall continue even after the termination of a program or project, where such damages are clearly attributable to that program or project and for a definite period to be determined by the Department and incorporated into the environmental compliance certificate.

Financial liability instruments may be in the form a trust fund, environmental insurance, surety bonds, letters of credit, as well as self-insurance. The choice of the guarantee instruments shall furnish the Department with evidence of availment of such instruments.

Article Three Pollution from Stationary Sources

SEC. 19. *Pollution From Stationary Sources.*- The Department shall, within two (2) years from the effectivity of this Act, and every two (2) years thereafter, review, or as the need therefore arises, revise and publish emission standards, to further improve the emission standards for stationary sources of air pollution. Such emission standards shall be based on mass rate of emission for all stationary source of air pollution based on internationally accepted standards, but not be limited to, nor be less stringent than such standards and with the standards set forth in this section. The standards, whichever is applicable, shall be the limit on the acceptable level of pollutants emitted from a stationary source for the protection of the public's health and welfare.

With respect to any trade, industry, process and fuel-burning equipment or industrial plant emitting air pollutants, the concentration at the point of emission shall not exceed the following limits:

| Pollutants | Standard Applicable to Source | Maximum Permissible Limits (mg/Ncm) | Method of Analysis ^a |
|---|--|---|---|
| 1. Antimony and its compounds | any source | 10 as Sb | AAS ^b |
| 2. Arsenic and its compounds | Any source | 10 as As | AAS ^b |
| 3. Cadmium and its compounds | Any source | 10 as Cd | AAS ^b |
| 4. Carbon Monoxide | Any industrial Source | 500 as CO | Orsat analysis |
| 5. Copper and its Compounds | Any industrial source | 100 as Cu | AAS ^b |
| 6. Hydrofluoric Acids and Fluoride compounds | Any source other than the manufacture of Aluminum from Alumina | 50 as HF | Titration with Ammonium Thiocyanate |
| 7. Hydrogen Sulfide | i) Geothermal Power Plants | c,d | Cadmium Sulfide Method |
| | ii) Geothermal Exploration and well-testing | e | |
| | iii) Any source other than (i) and (ii) | 7 as H ₂ S | Cadmium Sulfide Method |
| 8. Lead | Any trade, industry or process | 10 as Pb | AAS ^b |
| 9. Mercury | Any Source | 5 as elemental Hg | AAS ^b /Cold-Vapor Technique or Hg Analyzer |
| 10. Nickel and its compounds, except Nickel Carbonyl ^f | Any source | 20 as Ni | AAS ^b |
| 11. NO _x | i) Manufacture of Nitric Acid | 2,000 as acid and NO _x and calculated as NO ₂ | Phenol-disulfonic acid Method |

| | | | |
|---------------------------------------|---|--------------------------------------|-------------------------------|
| | ii) Fuel burning steam generators | | Phenol-disulfonic acid Method |
| | Existing Source | 1,500 as NO ₂ | |
| | New Source | | |
| | • Coal-Fired | 1,000 as NO ₂ | |
| | • Oil-Fired | 500 as NO ₂ | |
| | iii) Any source other than (i) and (ii) | | Phenol-disulfonic acid Method |
| | Existing Source | 1000 as NO ₂ | |
| | New Source | 500 as NO ₂ | |
| 12. Phosphorus Pentoxide ^g | Any source | 200 as P ₂ O ₅ | Spectrophotometry |
| 13. Zinc and its Compounds | Any source | 100 as Zn | AAS ^b |

^a Other equivalent methods approved by the Department may be used.

^b Atomic Absorption Spectrophotometry

^c All new geothermal power plants starting construction by 01 January 1995 shall control H₂S emissions to not more than 150 g/GMW-Hr

^d All existing geothermal power plants shall control H₂S emissions to not more than 200 g/GMW-Hr within 5 years from the date of effectivity of these revised regulations.

^e Best practicable control technology for air emissions and liquid discharges. Compliance with air and water quality standards is required.

^f Emission limit of Nickel Carbonyl shall not exceed 0.5 mg/Ncm.

^g Provisional Guideline

Provided, That the maximum limits in mg/n cm particulates in said sources shall be:

| | |
|--|------------|
| 1. Fuel Burning Equipment | |
| a) Urban or Industrial Area | 150 mg/Ncm |
| b) Other Area | 200 mg/Ncm |
| 2. Cement Plants (Kilns, etc.) | |
| 3. Smelting Furnaces | |
| 4. Other Stationary Sources^a | |
| | 200 mg/Ncm |

^a Other Stationary Sources means a trade, process, industrial plant, or fuel burning equipment other than thermal power plants, industrial boilers, cement plants, incinerators and smelting furnaces.

Provided, further, That the maximum limits for sulfur oxides in said sources shall be:

| | |
|--|-------------------------------|
| (1) Existing Sources | |
| (i) Manufacture of Sulfuric Acid and Sulf(on)ation Process | 2.0gm.Ncm as SO ₃ |
| (ii) Fuel burning Equipment | 1.5gm.Ncm as SO ₂ |
| (iii) Other Stationary Sources ^a | 1.0gm.Ncm as SO ₃ |
| (2) New Sources | |
| (i) Manufacture of Sulfuric Acid and Sulf(on)ation Process | 1.5 gm.Ncm as SO ₃ |
| (ii) Fuel Burning Equipment | 0.7 gm.Ncm as SO ₂ |
| (iii) Other Stationary Sources ^a | 0.2 gm.Ncm as SO ₃ |

^a Other Stationary Sources refer to existing and new stationary sources other than those caused by the manufacture of sulfuric acid and sulfonation process, fuel burning equipment and incineration.

For stationary sources of pollution not specifically included in the immediately preceding paragraph, the following emission standards shall not be exceeded in the exhaust gas:

I. Daily And Half Hourly Average Values

| | Daily Average Values | Half Hourly Average Values |
|--|----------------------------|-------------------------------------|
| Total dust | 10 mg/m ³ | 30 mg/m ³ |
| Gaseous and vaporous organic substances, expressed as total organic carbon | 10 mg/m ³ | 20 mg/m ³ |
| Hydrogen chloride (HCl) | 10 mg/m ³ | 60 mg/m ³ |
| Hydrogen fluoride (HF) | 1 mg/m ³ | 4 mg/m ³ |
| Sulfur dioxide (SO ₂) | 50 mg/m ³ | 200 mg/m ³ |
| Nitrogen monoxide (NO) and Nitrogen dioxide (NO ₂), expressed as nitrogen dioxide for incineration plants with a capacity exceeding 3 tonnes per hour | 200 mg/m ³ | 400 mg/m ³ |
| Nitrogen monoxide (NO) and nitrogen dioxide (NO ₂), expressed as nitrogen dioxide for incineration plants with a capacity of 3 tonnes per hour or less | 300 mg/m ³ | |
| Ammonia | 10 mg/m ³ | 20 mg/m ³ |

II. All the Average Values Over the Sample Period of a Minimum of 4 and Maximum of 8 Hours.

| | |
|--|-----------------------------------|
| Cadmium and its compounds, expressed as cadmium (Cd) | total 0.05 |
| Thallium and its compounds, expressed as thallium (Tl) | mg/m ³ |
| Mercury and its Compounds, expressed as mercury (Hg) | 0.05 mg/m ³ |
| Antimony and its compounds, expressed as antimony (Sb) | |
| Arsenic and its compounds, expressed as arsenic (As) | total 0.5 mg/m ³ |
| Lead and its compounds, expressed as lead (Pb) | |
| Chromium and its compounds, expressed as chromium (Cr) | |
| Cobalt and its compounds, expressed as cobalt (Co) | |
| Copper and its compounds, expressed as copper (Cu) | |
| Manganese and its compounds, expressed as manganese (Mn) | |
| Nickel and its compounds, expressed as nickel (Ni) | |
| Vanadium and its compounds, expressed as vanadium (V) | |
| Tin and its compounds, expressed as tin (Sn) | |

These average values cover also gaseous and the vapor forms of the relevant heavy metal emission as well as their compounds: Provided, That the emission of dioxins and furans into the air shall be reduced by the most progressive techniques: Provided, further, That all average of dioxin and furans measured over the sample period of a minimum of 5 hours and maximum of 8 hours must not exceed the limit value of 0.1 nanogram/m³.

Pursuant to Sec. 8 of this Act, the Department shall prepare a detailed action plan setting the emission standards or standards of performance for any stationary source the procedure for testing emissions for each type of pollutant, and the procedure for enforcement of said standards.

Existing industries, which are proven to exceed emission rates established by the Department in consultation with stakeholders, after a thorough, credible and transparent measurement process shall be allowed a grace period of eighteen (18) months for the establishment of an environmental management system and the installation of an appropriate air pollution control device : Provided, That an extension of not more than twelve (12) months may be allowed by the Department on meritorious grounds.

SEC. 20. *Ban on Incineration.*- Incineration, hereby defined as the burning of municipal, biomedical and hazardous waste, which process emits poisonous and toxic fumes is hereby prohibited; Provided, however, That the prohibition shall not apply to traditional small-scale method of community/neighborhood sanitation “*siga*”, traditional, agricultural, cultural, health, and food preparation and crematoria; Provided, further, That existing incinerators dealing with a biomedical wastes shall be out within three (3) years after the effectivity of this Act; Provided, finally, that in the interim, such units shall be limited to the burning of pathological and infectious wastes, and subject to close monitoring by the Department.

Local government units are hereby mandated to promote, encourage and implement in their respective jurisdiction a comprehensive ecological waste management that includes waste segregation, recycling and composting.

With due concern on the effects of climate change, the Department shall promote the use of state-of-the-art, environmentally-sound and safe non-burn technologies for the handling, treatment, thermal destruction, utilization, and disposal of sorted, unrecycled, uncomposted, biomedical and hazardous wastes.

Article Four Pollution from Motor Vehicles

SEC. 21. *Pollution from Motor Vehicles.*- a) The DOTC shall implement the emission standards for motor vehicles set pursuant to and as provided in this Act. To further improve the emission standards, the Department shall review, revise and publish the standards every two (2) years, or as the need arises. It shall consider the maximum limits for all major pollutants to ensure substantial improvement in air quality for the health, safety and welfare of the general public.

The following emission standards for type approval of motor vehicles shall be effective by the year 2003:

a) For light duty vehicles, the exhaust emission limits for gaseous pollutants shall be:

Emission Limits for Light Duty Vehicles Type Approval (Directive 91/441/EEC)

| CO (g/km) | HC + NO _x (g/km) | PM ^a (g/km) |
|--------------|--------------------------------|---------------------------|
| 2.72 | 0.97 | 0.14 |

^a for compression-ignition engines only

b) For light commercial vehicles, the exhaust emission limit of gaseous pollutants as a function of the given reference mass shall be:

| | Reference Weight (RW) (kg) | CO (g/km) | HC + NO _x (g/km) | PM ^a (g/km) |
|------------|----------------------------|-----------|-----------------------------|------------------------|
| Category 1 | 1250 < RW | 2.72 | 0.97 | 0.14 |
| Category 2 | 1250 < RW < 1700 | 5.17 | 1.4 | 0.19 |
| Category 3 | RW > 1700 | 6.9 | 1.7 | 0.25 |

^a for compression-ignition engines only

c) For heavy duty vehicles, the exhaust emission limits of gaseous pollutants shall be:

| CO (g/k/Wh) | HC (g/k/Wh) | NO _x (g/k/Wh) | PM (g/k/Wh) |
|----------------|----------------|-----------------------------|-------------------|
| 4.5 | 1.1 | 8.0 | 0.36 ^a |

^a In the case of engines of 85 kW or less, the limit value for particular emissions in increased by multiplying the quoted limit by a coefficient of 1.7

Fuel evaporative emission for spark-ignition engines shall not exceed 2.0 grams hydrocarbons per test. Likewise, it shall not allow any emission of gases from crankcase ventilation system into the atmosphere.

b) The Department, in collaboration with the DOTC, DTI and LGUs, shall develop an action plan for the control and management of air pollution from motor vehicles consistent with the Integrated Air Quality Framework. The DOTC shall enforce compliance with the emission standards for motor vehicles set by the Department. The DOTC may deputize other law enforcement agencies and LGUs for this purpose. To this end, the DOTC shall have the power to:

[1] Inspect and monitor the emissions of motor vehicles;

[2] Prohibit or enjoin the use of motor vehicles or a class of motor vehicles in any area or street at specified times; and

[3] Authorize private testing emission testing centers duly accredited by the DTI.

c) The DOTC, together with the DTI and the Department, shall establish the procedures for the inspection of motor vehicles and the testing of their emissions for the purpose of determining the concentration and/or rate of pollutants discharged by said sources.

d) In order to ensure the substantial reduction of emissions from motor vehicles, the Department of Trade and Industry (DTI), together with the DOTC and the Department shall formulate and implement a national motor vehicle inspection and maintenance program that will promote efficient and safe operation of all motor vehicles. In this regard, the DTI shall develop and implement standards and procedures for the certification of training institutions, instructors and facilities and the licensing of qualified private service centers and their technicians as prerequisite for performing the testing, servicing, repair and the required adjustment to the vehicle emission system. The DTI shall likewise prescribe regulations requiring the disclosure of odometer readings and the use of tamper-resistant odometers for all motor vehicles including tamper-resistant fuel management systems for the effective implementation of the inspection and maintenance program.

SEC. 22. Regulation of All Motor Vehicles and Engines.- Any imported new or locally-assembled new motor vehicle shall not be registered unless it complies with the emission standards set pursuant to this Act, as evidenced by a Certificate of Conformity (COC) issued by the Department.

Any imported new motor vehicle engine shall not be introduced into commerce, sold or used unless it complies with emission standards set pursuant to this Act.

Any imported used motor vehicle or rebuilt motor vehicle using new or used engines, major parts or components shall not be registered unless it complies with the emission standards.

In case of non-compliance, the importer or consignee may be allowed to modify or rebuild the vehicular engine so it will be in compliance with applicable emission standards.

No motor vehicle registration (MVR) shall be issued unless such motor vehicle passes the emission testing requirement promulgated in accordance with this Act. Such testing shall be conducted by the DOTC or its authorized inspection centers within sixty (60) days prior to date of registration.

The DTI shall promulgate the necessary regulations prescribing the useful life of vehicles and engines including devices in order to ensure that such vehicles will conform to the emissions which they were certified to meet. These regulations shall include provisions for ensuring the durability of emission devices.

SEC. 23. *Second-Hand Motor Vehicle Engines.*- Any imported second-hand motor vehicle engine shall not be introduced into commerce, sold or used unless it complies with emission standards set pursuant to this Act.

Article Five Pollution from Other Sources

SEC. 24. *Pollution from smoking.*- Smoking inside a public building or an enclosed public place including public vehicles and other means of transport or in any enclosed area outside of one's private residence, private place of work or any duly designated smoking area is hereby prohibited under this Act. This provision shall be implemented by the LGUs.

SEC. 25. *Pollution from other mobile sources.*- The Department, in coordination with appropriate agencies, shall formulate and establish the necessary standards for all mobile sources other than those referred to in Sec. 21 of this Act. The imposition of the appropriate fines and penalties from these sources for any violation of emission standards shall be under the jurisdiction of the DOTC.

Chapter 3 Fuels, Additives, Substances and Pollutants Article One Fuels, Additives and Substances

SEC. 26. *Fuels and Additives.*- Pursuant to the Air Quality Framework to be established under Section 7 of this Act, the Department of Energy (DOE), co-chaired by the Department of Environment and Natural Resources (DENR), in consultation with the Bureau of Product Standards (BPS) of the DTI, the DOST, the representatives of the fuel and automotive industries, academe and the consumers shall set the specifications for all types of fuel and fuel-related products, to improve fuel composition for increased efficiency and reduced emissions: Provided, however, that the specifications for all types of fuel and fuel-related products set forth pursuant to this section shall be adopted by the BPS as Philippine National Standards (PNS).

The DOE shall also specify the allowable content of additives in all types of fuels and fuel-related products. Such standards shall be based primarily on threshold levels of health and research studies. On the basis of such specifications, the DOE shall likewise limit the content or begin that phase-out of additives in all types of fuels and fuel-related products as it may

deem necessary. Other agencies involved in the performance of this function shall be required to coordinate with the DOE and transfer all documents and information necessary for the implementation of this provision.

Consistent with the provisions of the preceding paragraphs under this section, it is declared that:

a) not later than eighteen (18) months after the effectivity of this Act, no person shall manufacture, import, sell, supply, offer for sale, dispense, transport or introduce into commerce unleaded premium gasoline fuel which has an anti-knock index (AKI) of not less than 87.5 and Reid vapor pressure of not more than 9 psi. Within six (6) months after the effectivity of this Act, unleaded gasoline fuel shall contain aromatics not to exceed forty-five percent (45%) by volume and benzene not to exceed four percent (4%) by volume; Provided, that by year 2003, unleaded gasoline fuel should contain aromatics not to exceed thirty-five percent (35%) by volume and benzene not to exceed two percent (2%) by volume;

b) not later than eighteen (18) months after the effectivity of this Act, no person shall manufacture, import, sell, supply, offer for sale, dispense, transport or introduce into commerce automotive diesel fuel which contains a concentration of sulfur in excess of 0.20% by weight with a cetane number of index of not less than forty-eight (48): Provided, That by year 2004, content of said sulfur shall be 0.05% by weight; and

c) not later than eighteen (18) months after the effectivity of this Act, no Person shall manufacture, import, sell, supply, offer for sale, dispense, transport or introduce into commerce industrial diesel fuel which contains a concentration of sulfur in excess of 0.30% (by weight).

Every two (2) years thereafter or as the need arises, the specifications of unleaded gasoline and of automotive and industrial diesel fuels shall be reviewed and revised for further improvement in formulation and in accordance with the provisions of this Act.

The fuels characterized above shall be commercially available. Likewise, the same shall be the reference fuels for emission and testing procedures to be established in accordance with the provisions of this Act.

Any proposed additive shall not in any way increase emissions of any of the regulated gases which shall include, but not limited to carbon monoxide, hydrocarbons, and oxides of nitrogen and particulate matter, in order to be approved and certified by the Department.

SEC. 27. Regulation of Fuels and Fuel Additives.- The DOE, in coordination with the Department and the BPS, shall regulate the use of any fuel or fuel additive. No manufacturer, processor or trader of any fuel or additive may import, sell, offer for sale, or introduce into commerce such fuel for additive unless the same has been registered with the DOE. Prior to registration, the manufacturer, processor or trader shall provide the DOE with the following relevant information:

a) Product identity and composition to determine the potential health effects of such fuel additives;

b) Description of the analytical technique that can be used to detect and measure the additive in any fuel;

c) Recommended range of concentration; and

d) Purpose in the use of the fuel and additive.

SEC. 28. *Misfueling.*- In order to prevent the disabling of any emission control device by lead contamination, no person shall introduce or cause or allow the introduction of leaded gasoline into any motor vehicle equipped with a gasoline tank filler inlet and labeled "*unleaded gasoline only*". This prohibition shall also apply to any person who knows or should know that such vehicle is designed solely for the use of unleaded gasoline.

SEC. 29. *Prohibition on Manufacture, Import and Sale of leaded Gasoline and of Engines and/or Components Requiring Leaded Gasoline.*- Effective not later than eighteen (18) months after the enactment of this Act, no person shall manufacture, import, sell, offer for sale, introduce into commerce, convey or otherwise dispose of, in any manner, leaded gasoline and engines and components requiring the use of leaded gasoline.

For existing vehicles, the DTI shall formulate standards and procedures that will allow non-conforming engines to comply with the use of unleaded fuel within five(5) years after the effectivity of this Act.

Article Two Other Pollutants

SEC. 30. *Ozone-Depleting Substances.*- Consistent with the terms and conditions of the Montreal Protocol on Substances that Deplete the Ozone Layer and other international agreements and protocols to which the Philippines is a signatory, the Department shall phase out ozone-depleting substances.

Within sixty (60) days after the enactment of this Act, the Department shall publish a list of substances which are known to cause harmful effects on the stratospheric ozone layer.

SEC. 31. *Greenhouse Gases.*- The Philippine Atmospheric, Geophysical and Astronomical Service Administration (PAGASA) shall regularly monitor meteorological factors affecting environmental conditions including ozone depletion and greenhouse gases and coordinate with the Department in order to effectively guide air pollution monitoring and standard-setting activities.

The Department, together with concerned agencies and local government units, shall prepare and fully implement a national plan consistent with the United Nations Framework Convention on Climate Change and other international agreements, conventions and protocols on the reduction of greenhouse gas emissions in the country.

SEC. 32. *Persistent Organic Pollutants.*- The Department shall, within a period of two (2) years after the enactment of this Act, establish an inventory list of all sources of Persistent Organic Pollutants (POPs) in the country. The Department shall develop short-term and long-term national government programs on the reduction and elimination of POPs such as dioxins and furans. Such programs shall be formulated within a year after the establishment of the inventory list.

SEC. 33. *Radioactive Emissions.*- All projects which will involve the use of atomic and/or nuclear energy, and will entail release and emission of radioactive substances into the environment, incident to the establishment or possession of nuclear energy facilities and radioactive materials, handling, transport, production, storage, and use of radioactive materials, shall be regulated in the interest of public health and welfare by the Philippine Nuclear Research Institute (PNRI), in coordination with Department and other appropriate government agencies.

Chapter 4 Institutional Mechanism

SEC. 34. *Lead Agency.*- The Department, unless otherwise provided herein, shall be the primary government agency responsible for the implementation and enforcement of this Act. To be more effective in this regard, The Department's Environmental Management Bureau (EMB) shall be converted from a staff bureau to a line bureau for a period of no more than two (2) years, unless a separate, comprehensive environmental management agency is created.

SEC. 35. *Linkage Mechanism.*- The Department shall consult, participate, cooperate and enter into agreement with other government agencies, or with affected non-governmental (NGOs) or people's organizations (POs), or private enterprises in the furtherance of the objectives of this Act.

SEC. 36. *Role of Local Government Units.*- Local Government Units (LGUs) shall share the responsibility in the management and maintenance of air quality within their territorial jurisdiction. Consistent with Sections 7, 8 and 9 of this Act, LGUs shall implement air quality standards set by the Board in areas within their jurisdiction; Provided, however, That in case where the board has not been duly constituted and has not promulgated its standards, the standards set forth in this Act shall apply.

The Department shall provide the LGUs with technical assistance, trainings and a continuing capability-building program to prepare them to undertake full administration of the air quality management and regulation within their territorial jurisdiction.

SEC. 37. *Environmental and Natural Resources Office.*- There may be established an Environment and Natural Resources Office in every province, city, or municipality which shall be headed by the environment and natural resources officer and shall be appointed by the Chief Executive of every province, city or municipality in accordance with the provisions of Section 484 of Republic Act No. 7160. Its powers and duties, among others, are:

- a) To prepare comprehensive air quality management programs, plans and strategies within the limits set forth in Republic act. No. 7160 and this Act which shall be implemented within its territorial jurisdiction upon the approval of the sanggunian;
- b) To provide technical assistance and support to the governor or mayor, as the case may be, in carrying out measures to ensure the delivery of basic services and the provision of adequate facilities relative to air quality;
- c) To take the lead in all efforts concerning air quality protection and rehabilitation;
- d) To recommend to the Board air quality standards which shall not exceed the maximum permissible standards set by rational laws;
- e) To coordinate with other government agencies and non-governmental organizations in the implementation of measures to prevent and control air pollution; and
- f) Exercise such other powers and perform such duties and functions as may be prescribed by law or ordinance: Provided, however, That in provinces/cities/municipalities where there are no environment and natural resources officers, the local executive concerned may designate any of his official and/or chief of office preferably the provincial, city or municipal agriculturist, or any of his employee: Provided, finally, That in case an employee is designated as such, he must have sufficient experience in environmental and natural resources management, conservation and utilization.

SEC. 38. *Record-keeping, Inspection, Monitoring and Entry by the Department.*- The Department or its duly accredited entity shall, after proper consultation and notice, require any person who owns or operates any emissions source or who is subject to any requirement of this Act to:

- (a) establish and maintain relevant records;
- (b) make relevant reports;
- (c) install, use and maintain monitoring equipment or methods;
- (d) sample emission, in accordance with the methods, locations, intervals and manner prescribed by the Department;
- (e) keep records on control equipment parameters, production variables or other indirect data when direct monitoring of emissions is impractical; and
- (f) provide such other information as the Department may reasonably require.

Pursuant to this Act, the Department, through its authorized representatives, shall have the right of:

- (a) entry or access to any premises including documents and relevant materials as referred to in the herein preceding paragraph;
- (b) inspect any pollution or waste source, control device, monitoring equipment or method
and required;
- (c) test any emission.

Any record, report or information obtained under this section shall be made available to the public, except upon a satisfactory showing to the Department by the entity concerned that the record, report or information, or parts thereof, if made public, would divulge secret methods or processes entitled to protection as intellectual property. Such record, report or information shall likewise be incorporated in the Department's industrial rating system.

SEC. 39. *Public Education and Information Campaign.*- A continuing air quality information and education campaign shall promoted by the Department, the Department of Education, Culture and Sports (DECS), the Department of the Interior and Local Government (DILG), the Department of Agriculture (DA) and the Philippine Information Agency (PIA). Consistent with Sec. 7 of this Act, such campaign shall encourage the participation of other government agencies and the private sector including NGOs, POs, the academe, environmental groups and other private entities in a multi-sectoral information campaign.

Chapter 5 Actions

SEC. 40. *Administrative Action.*- Without prejudice to the right of any affected person to file an administrative action, the Department shall, on its own instance or upon verified complaint by any person, institute administrative proceedings against any person who violates:

- (a) Standards or limitation provided under this Act; or
- (b) Any order, rule or regulation issued by the Department with respect to such standard or limitation.

SEC. 41. *Citizen Suits.*- For purposes of enforcing the provisions of this Act or its implementing rules and regulations, any citizen may file an appropriate civil, criminal or administrative action in the proper courts against:

- (a) Any person who violates or fails to comply with the provisions of this Act or its implementing rules and regulations; or

(b) The Department or other implementing agencies with respect to orders, rules and regulations issued inconsistent with this Act; and/or

(c) Any public officer who willfully or grossly neglects the performance of an act specifically enjoined as a duty by this Act or its implementing rules and regulations; or abuses his authority in the performance of his duty; or, in any manner, improperly performs his duties under this Act or its implementing rules and regulations: Provided, however, That no suit can be filed until thirty-day (30) notice has been taken thereon.

The court shall exempt such action from the payment of filing fees, except fees for actions not capable of pecuniary estimations, and shall likewise, upon prima facie showing of the non-enforcement or violation complained of, exempt the plaintiff from the filing of an injunction bond for the issuance of a preliminary injunction.

Within thirty (30) days, the court shall make a determination if the compliant herein is malicious and/or baseless and shall accordingly dismiss the action and award attorney's fees and damages.

SEC. 42. *Independence of Action.*- The filing of an administrative suit against such person/entity does not preclude the right of any other person to file any criminal or civil action. Such civil action shall proceed independently.

SEC. 43. *Suits and Strategic Legal Actions Against Public Participation and the Enforcement of This Act.*- Where a suit is brought against a person who filed an action as provided in Sec. 41 of this Act, or against any person, institution or government agency that implements this Act, it shall be the duty of the investigating prosecutor or the court, as the case may be, to immediately make a determination not exceeding thirty (30) days whether said legal action has been filed to harass, vex, exert undue pressure or stifle such legal recourses of the person complaining of or enforcing the provisions of this Act. Upon determination thereof, evidence warranting the same, the court shall dismiss the case and award attorney's fees and double damages.

This provision shall also apply and benefit public officers who are sued for acts committed in their official capacity, their being no grave abuse of authority, and done in the course of enforcing this Act.

SEC. 44. *Lien Upon Personal and Immovable Properties of Violators.*- Fines and penalties imposed pursuant to this Act shall be liens upon personal or immovable properties of the violator. Such lien shall, in case of insolvency of the respondent violator, enjoy preference to laborer's wages under Articles 2241 and 2242 of Republic Act No. 386, otherwise known as the New Civil Code of the Philippines.

Chapter 6 Fines and Penalties

SEC. 45. *Violation of Standards for Stationary Sources.*- For actual exceedance of any pollution or air quality standards under this Act or its rules and regulations, the Department, through the Pollution Adjudication Board (PAB), shall impose a fine of not more than One hundred thousand pesos (P100,000.00) for every day of violation against the owner or operator of a stationary source until such time that the standards have been complied with.

For purposes of the application of the fines, the PAB shall prepare a fine rating system to adjust the maximum fine based on the violator's ability to pay, degree of willfulness, degree of negligence, history of non-compliance and degree of recalcitrance: Provided, That in case of negligence, the first time offender's ability to pay may likewise be considered by the Pollution Adjudication Board: Provided, further, That in the absence of any extenuating or aggravating

circumstances, the amount of fine for negligence shall be equivalent to one-half of the fine for willful violation.

The fines herein prescribed shall be increased by at least ten percent (10%), every three (3) years to compensate for inflation and to maintain the deterrent function of such fines.

In addition to the fines, the PAB shall order closure, suspension of development, construction, or operations of the stationary sources until such time that proper environmental safeguards are put in place: Provided, That an establishment liable for a third offense shall suffer permanent closure immediately. This paragraph shall be without prejudice to the immediate issuance of an ex parte order for such closure, suspension of development or construction, or cessation of operations during the pendency of the case upon *prima facie* evidence that there is imminent threat to life, public health, safety or general welfare, or to plant or animal life, or whenever there is an exceedance of the emission standards set by the Department and/or the Board and/or the appropriate LGU.

SEC. 46. Violation of Standards for Motor Vehicles.- No motor vehicle shall be registered with the DOTC unless it meets the emission standards set by the Department as provided in Sec. 21 hereof.

Any vehicle suspected of violation of emission standards through visual signs, such as, but not limited to smoke-belching, shall be subjected to an emission test by a duly authorized emission testing center. For this purpose, the DOTC or its authorized testing center shall establish a roadside inspection system. Should it be shown that there was no violation of emission standards, the vehicle shall be immediately released. Otherwise, a testing result indicating an exceedance of the emission standards would warrant the continuing custody of the impounded vehicle unless the appropriate penalties are fully paid, and the license plate is surrendered to the DOTC pending the fulfillment of the undertaking by the owner/operator of the motor vehicle to make the necessary repairs so as to comply with the standards. A pass shall herein be issued by the DOTC to authorize the use of the motor vehicle within a specified period that shall not exceed seven (7) days for the sole purpose of making the necessary repairs on the said vehicle. The owner/operator of the vehicle shall be required to correct its defects and show proof of compliance to the appropriate pollution control office before the vehicle can be allowed to be driven on any public or subdivision roads.

In addition, the driver and operator of the apprehended vehicle shall undergo a seminar on pollution control management conducted by the DOTC and shall also suffer the following penalties:

- a) First Offense - a fine not to exceed Two Thousand Pesos (P2,000.00);
- b) Second Offense - a fine not less than Two Thousand Pesos (P2,000.00) and not to exceed Four Thousand Pesos (P4,000.00); and
- c) Third offense - one (1) year suspension of the Motor Vehicle Registration (MVR) and a fine of not less than Four Thousand Pesos (P4,000.00) and not more than Six thousand pesos (P6,000.00).

Any violation of the provisions of Sec. 21 paragraph (d) with regard to national inspection and maintenance program, including technicians and facility compliance shall be penalized with a fine of not less than Thirty Thousand Pesos (P30,000.00) or cancellation of license of both the technician and the center, or both, as determined by the DTI.

All law enforcement officials and deputized agents accredited to conduct vehicle emissions testing and apprehensions shall undergo a mandatory training on emission standards and regulations. For this purpose, the Department, together with the DOTC, DTI, DOST, Philippine

National Police (PNP) and other concerned agencies and private entities shall design a training program.

SEC. 47. *Fines and Penalties for Violations of Other Provisions in the Act.*- For violations of all other provisions provided in this Act and of the rules and regulations thereof, a fine of not less than Ten thousand pesos (P10,000) but not more than One Hundred thousand Pesos (P100,000) or six (6) months to six (6) years imprisonment or both shall be imposed. If the offender is a juridical person, the president, manager, directors, trustees, the pollution control officer or the officials directly in charge of the operations shall suffer the penalty herein provided.

SEC. 48. *Gross Violations.*- In case of gross violation of this Act or its implementing rules and regulations, the PAB shall recommend to the proper government agencies to file the appropriate criminal charges against the violators. The PAB shall assist the public prosecutor in the litigation of the case. Gross violation shall mean:

[a] three (3) or more specific offenses within a period of one (1) year;

[b] three (3) or more specific offenses with three (3) consecutive years;

[c] blatant disregard of the orders of the PAB, such as but not limited to the breaking of seal, padlocks and other similar devices, or operation despite the existence of an order for closure, discontinuance or cessation of operation; and

[d] irreparable or grave damage to the environment as a consequence of any violation of the provisions of this Act.

Offenders shall be punished with imprisonment of not less than six (6) years but not more than ten (10) years at the discretion of the court. If the offender is a juridical person, the president, manager, directors, trustees, the pollution control officer or the officials directly in charge of the operations shall suffer the penalty herein provided.

Chapter 7 Final Provisions

SEC. 49. *Potential Loss or Shifts of Employment.*- The Secretary of Labor is hereby authorized to establish a compensation, retraining and relocation program to assist workers laid off due to a company's compliance with the provisions of this Act.

SEC. 50. *Appropriations.*- An amount of Seven Hundred Fifty Million Pesos (P750,000,000.00) shall be appropriated for the initial implementation of this Act, of which, the amount of Three Hundred Million Pesos (P300,000,000.00) shall be appropriated to the Department; Two Hundred Million Pesos (P200,000,000.00) to the DTI; One Hundred Fifty Million Pesos (P150,000,000.00) to the DOTC; and One Hundred Million Pesos (P100,000,000.00) to the DOE.

Thereafter, the amount necessary to effectively carry out the provisions of this Act shall be included in the General Appropriations Act.

SEC. 51. *Implementing Rules and Regulations.*- The Department, in coordination with the Committees on Environment and Ecology of the Senate and House of Representatives, respectively and other agencies, shall promulgate the implementing rules and regulations for this Act, within one (1) year after the enactment of this Act: Provided, That rules and regulations issued by other government agencies and instrumentalities for the prevention and/or abatement of pollution not inconsistent with this Act shall supplement the rules and regulations issued by the Department pursuant to the provisions of this Act.

SEC. 52. *Report to Congress.*- The Department shall report to Congress, not later than March 30 of every year following the approval of this Act, the progress of the pollution control efforts and make the necessary recommendations in areas where there is need for legislative action.

SEC. 53. *Joint Congressional Oversight Committee.*- There is hereby created a joint congressional oversight committee to monitor the implementation of this Act. The committee shall be composed of five (5) senators and five (5) representatives to be appointed by the Senate President and the Speaker of the House of Representatives, respectively, the oversight committee shall be co-chaired by a senator and a representative designated by the Senate President and the Speaker of the House of Representatives, respectively.

The mandate given to the joint congressional oversight committee under this Act shall be without prejudice to the performance of the duties and functions by the respective existing oversight committees of the Senate and the House of Representatives.

SEC. 54. *Separability of Provisions.*- If any provision of this Act or the application of such provision to any person or circumstances is declared unconstitutional, the remainder of the Act or the application of such provision to other person or circumstances shall not be affected by such declaration.

SEC. 55. *Repealing Clause.*- Presidential Decree No. 1181 is hereby repealed. Presidential Decrees Nos. 1152, 1586 and Presidential Decree No. 984 are partly modified. All other laws, orders, issuance, rules and regulations inconsistent herewith are hereby repealed or modified accordingly.

SEC. 56. *Effectivity.*- This Act shall take effect fifteen (15) days from the date of its publication in the Official Gazette or in at least two (2) newspapers of general circulation.

Technical Education and Skills Development Authority
National TVET Trainers Academy

VALIDATION OF COMPETENCY-BASED LEARNING MATERIALS (CBLMs)

QUESTIONNAIRE

Introduction:

The National TVET Trainers Academy (NTTA) of the Technical Education and Skills Development Authority (TESDA) is undertaking continuous validation of the herein contained Competency-Based Learning Materials (CBLMs), through their actual use, for purposes of improving the CBLMs.

The users of these CBLMs are encouraged to give their valuable comments and recommendations to meet the given purpose. The patience and diligence of the users in answering every item of the questionnaire are requested. All responses shall be treated with confidentiality. As found acceptable, the indicated comments and recommendations would be considered in the process of improvement of the materials.

Instruction:

The questionnaire is divided into two parts. **Part I** requires a more detailed and in-depth analysis of the materials in order to obtain important notes which would greatly contribute to their improvement. **Part II** is more general in approach in gathering comments on the CBLMs.

Please tick ☐ the box corresponding to your answer. If you tick NO, please write your comments, suggestions and observations on the space provided.

Please accomplish the Validation Instrument and submit to your trainer/facilitator at the end of the training.

Module Title : _____

Name: _____

Last

First

M.I.

Position/Designation: _____ No. of Years of Experience as Trainer _____

Title of Qualifications Earned: _____

Educational

Attainment: _____

Training Institution/ Company _____

Address: _____

Tel/CP Nos. _____ E-mail Address: _____

Signature: _____ Date: _____

PART I

Please check the appropriate box. Aside from the correctness and orderliness of the materials, please write on the space provided your specific comments, suggestion and observation especially when you check the box corresponding to the **NO** reply.

1) COVER PAGE:

Does the Cover Page supplies enough information to immediately recognize that the material is a CBLM?

YES

NO

If the answer is **NO**, please indicate your suggestion/observation.

COVER PAGE: _____

2) Table of Content: Are all the materials inside the package listed down in correct sequential order ?

YES

NO

3) CBLM User's Guide: Does the CBLM User's Guide give clear direction on how to use the CBLM?

YES

NO

4) List of Competency: Does this page inform and guide you on the scope of the material and give you a comprehensive top down perspective of the whole program?

YES

NO

5) Module Content: Does this page help you understand the different activities of the module which conforms to the requirement of the competency standard/competency-based curriculum?

YES

| | | |
|---|--|---|
| <div style="border: 1px solid black; padding: 5px; display: inline-block;">NO</div> | | If NO, please specify which part of the Module Content NOT helpful to you and give us your suggestion. |
| <hr/> <hr/> <hr/> | | |
| 6) Competency Summary: Does this material give you clear introduction and description of the unit of competency you are about to learn, including the Learning Outcomes and Assessment Criteria? | | |
| <div style="border: 1px solid black; padding: 5px; display: inline-block;">YES</div> | | If NO, please specify which part of the Competency Summary not clear to you and give us your suggestion. |
| <div style="border: 1px solid black; padding: 5px; display: inline-block;">NO</div> | | |
| <hr/> <hr/> <hr/> | | |
| 7) Learning Outcome Summary: Does the content of the Learning Outcome Summary give you a clear outline of the Contents, Performance Criteria, Condition and Assessment Method that would take place in a given Learning Outcome? | | |
| <div style="border: 1px solid black; padding: 5px; display: inline-block;">YES</div> | | If NO, please specify which part of the Learning Outcome Summary is not clear to you and give us your suggestion. |
| <div style="border: 1px solid black; padding: 5px; display: inline-block;">NO</div> | | |
| <hr/> <hr/> <hr/> | | |
| 8) Learning Experience: Does the content of this page give you a clear and sequential guide to the activities in a specific Learning Outcome? | | |
| <div style="border: 1px solid black; padding: 5px; display: inline-block;">YES</div> | | If NO, please specify which part of the Learning Experience is not clear and in order. |
| <div style="border: 1px solid black; padding: 5px; display: inline-block;">NO</div> | | |
| <hr/> <hr/> <hr/> | | |
| 9) Are the Information Sheets readable, easy to understand and address the knowledge requirements of the specific Learning Outcome? | | |
| <div style="border: 1px solid black; padding: 5px; display: inline-block;">YES</div> | | If NO , please specify which Information Sheet is not an appropriate learning content. |
| <div style="border: 1px solid black; padding: 5px; display: inline-block;">NO</div> | | |
| <hr/> <hr/> <hr/> | | |

10) Are the **Information Sheets sufficient to attain the knowledge required in the assessment criteria of the specific Learning Outcome?**
If not, please write the missing content on the spaces provided below.

| | |
|------------|-----------|
| YES | NO |
|------------|-----------|

LO1: _____

LO2: _____

LO3: _____

LO4: _____

LO5: _____

11) Are the prepared **Self-Checks have clear direction and relevant test items to measure the knowledge learned in the information sheet?**

| | | | |
|--|------------|-----------|---|
| <table border="1"> <tr> <td>YES</td> </tr> <tr> <td>NO</td> </tr> </table> | YES | NO | If NO, please specify which Self-check do not have clear direction and relevant test items. |
| | YES | | |
| NO | | | |
| _____ | | | |

12) Are the **Task/Operation/Job Sheets in appropriate sequence, easy to understand and would help in the attainment of the skills necessary for the learning outcome?**

| | | | |
|--|------------|-----------|--|
| <table border="1"> <tr> <td>YES</td> </tr> <tr> <td>NO</td> </tr> </table> | YES | NO | If NO, please specify which Task/Operation/Job Sheet is: |
| | YES | | |
| NO | | | |
| _____ | | | |

NOT In appropriate sequence. _____

NOT easy to understand _____

would NOT help in the attainment of the skills necessary for the learning outcome

13) Are the Task/Operation/Job Sheets sufficient to attain the skills required in the assessment criteria of each learning outcome?

YES

NO

If NO, please specify which Task/Operation/Job Sheet should be included in the LOs below:

LO1: _____

LO2: _____

LO3: _____

LO4: _____

LO5: _____

14) Are the Procedural/Performance Criteria Checklists valid, sufficient and available for every Operation/Task/Job Sheets?

YES

NO

If **NO**, please specify the appropriate Procedural/Performance Criteria Checklist.

15) Is the list of references/ bibliography of materials for further readings or Acknowledgement page included in this package?

YES

NO

If **NO**, please specify which module does NOT have the Bibliography or Acknowledgement page

PART II

| | |
|--|---------------------|
| Competency-Based Learning Materials Checklist Directions: Rate the CBLM against each of the following criteria. Place a tick [/] in the NO or YES box beside each item to indicate how well the materials meet the criterion. | Unit of Competency: |
| | Title of Module: |
| | Title of LO: |

| | Yes | No | Comments |
|---|-----|----|----------|
| 1. The learning materials contain the following basic components: | | | |
| a. clear directions for using the learning materials or self explanatory format | | | |
| b. a rationale or introduction explaining the purpose and importance of the skill or knowledge being covered. | | | |
| c. a competency statement of learning outcomes | | | |
| d. clear, complete explanations of the activities to be completed in order to achieve each learning outcomes | | | |
| e. instructions sheet or reference to other resources/references containing the needed information | | | |
| f. device for immediate feedback | | | |
| g. a performance checklist designed to measure actual student performance of the competency | | | |
| 2. The learning materials also contain the following components: | | | |
| a. listing of prerequisites | | | |
| b. definition of terms | | | |
| c. Job sheets/Task Sheets | | | |
| d. Self-checks | | | |
| d. assessment instrument | | | |
| 3. The learning material either includes all necessary materials or clearly specifies what outside materials are needed | | | |
| 4. The learning material contains a variety of activities to suit a range of learning abilities and style | | | |
| 5. The learning materials provides opportunities for trainees to interact with peers, trainer, and others | | | |
| 6. Supplementary enrichment activities are provided to meet the needs and interest of the trainees. | | | |

Other Comments/Suggestions:

Thank you for your patience and diligence in answering every item of the questionnaire, as requested.

- from the NTTA Family -

Director



Dir. F. B. Zurbano



The NTTA Team

Developers:



Ms. P.V. Lucas



Ms. A.P. Panem



Mr. N.M. Pascual



Ms. R.C. Agub



Ms. K.V. Aguilar



Mr. A.P. Francisco



Mr. L.A. Ladia

Administrative Support:



Mr. R.M. Mirasol



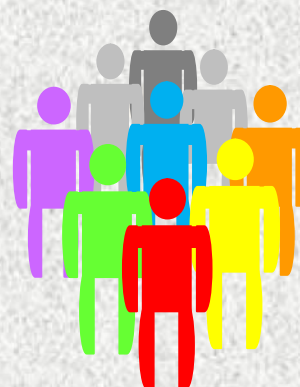
Ms. L.I. De Guzman



Mr. J.M. Casas



Mr. R.B. Mueden



The Competency-Based Learning Materials contained herein support the development of the competency **Maintain Training Facilities**, which is one of the competencies of a Technical Education and Skills Development trainer under the Deliver Training Session competency of the Trainers Methodology Level I Qualification, in reference to the Philippine TVET Trainers Qualification Framework.

The PTTQF is the system that establishes the structure and specifies the competency standards, as bases for certification of TESD trainers given different roles and qualification levels as follows: TM Level I: Trainer/Assessor; TM Level II: Training Designer/Developer; TM Level III: Training Mentor; and TM Level IV: Master Trainer.

The competencies under the TM Level I Qualification include the following:

Deliver Training Session

- Plan Training Sessions;
- Facilitate Learning Sessions;
- Supervise Work-Based Learning;
- Utilize Electronic Media in Facilitating Training;
- Maintain Training Facilities; and

Conduct Competency Assessment.



Technical Education and Skills Development Authority
National TVET Trainers Academy



The National TVET Trainers Academy of the Technical Education and Skills Development Authority leads in training and development of TESD trainers aligned to industry requirements. The NTTA is highly recognized for its global expertise, state-of-the-art training technologies and innovative programs and services, whose graduates are sought for employment both local and overseas.

The NTTA serves the TESD trainers by providing them with continuous and integrated programs that help them attain the appropriate qualification. By doing this, it helps TESDA achieve its purpose of providing quality TESD; and drives the Authority's economic model through proactively responding to TESD trainers' training needs based on industry demands.

Continuously, the NTTA improves its programs to exceed its customers' satisfaction level. Its programs are also explicitly designed such that other than graduates, secondary output training materials are produced resulting to savings tantamount to materials development cost. In addition, the NTTA empowers its regional counterparts and manages them to produce "multiplier effect" to extend its reach and expand service coverage. Likewise, it constantly provides its counterparts with technical assistance to standardize training delivery, thus ascertain program quality.

For inquiries, please contact:

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