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Department of Environment and Natural Resources
ENVIRONMENTAL MANAGEMENT BUREAU
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MAR 2 6 2019

EMB MEMORANDUM CIRCULAR
No. 2019- 004

SUBJECT: ADVANCED TRAINING MODULES FOR POLLUTION CONTROL OFFICERS (PCOs)

Pursuant to Sec. 11 (Renewal of PCO Accreditation) of DENR Administrative Order (DAO) No. 2014-02 otherwise known as the "Revised Guidelines for Pollution Control Officer (PCO) Accreditation", the PCO accreditation shall be renewed every three (3) years provided that he/she has completed at least forty (40) hours of cumulative relevant PCO Training.

In line with this, the following Advanced Training Modules for PCO are hereby prescribed in order to ensure uniformity and standardization of all materials to be used in the training and for renewal/re-accreditation of PCO, the details of which, are hereto attached as Annexes A-k to include, but not limited, to the following:

a) Advanced Training Module on Air Quality Management,
b) Advanced Training Module on Chemical Management,
c) Advanced Training Module on Hazardous Waste Management,
d) Advanced Training Module on Solid Waste Management,
e) Advanced Training Module on Water and Wastewater Management,
f) Advanced Training Module on Climate Change Adaptation and Mitigation,
g) Environmental Management Training Module for Small and Medium Enterprises,
h) Hazardous Waste Management and Emergency Response Training Module for Telecommunications, gasoline stations and other related SME,
i) Medical and Hazardous Waste Management and Emergency Response Training Module for Healthcare Facilities,
j) Sector-Specific Polychlorinated Biphenyls and Emergency Response Training Module; and
k) Other Advanced Training Modules to be approved by the EMB Central Office

All Resource Speakers from EMB-recognized PCO Training Organizations/Institutions are hereby directed to complete the Trainers' Training on the above prescribed modules before a Certificate of Recognition as Trainor/Resource Speakers shall be issued by this Office. The training organization/institution shall only be recognized on each training module completed. No training organization/institution shall conduct basic and advanced trainings until such time that the Certificate of Recognition has been officially issued. Otherwise, their application for recognition shall be denied.

Training conducted without the approved modules shall not be recognized as basis for accreditation.

Further, all EMB Regional Directors are directed to ensure compliance with this Order in their respective regions.

This Memorandum Circular shall take effect immediately.

ENGR. METODIO U. TURBELLA
Director

Protect the environment... Protect life...

Department of Environment and Natural Resources
ENVIRONMENTAL MANAGEMENT BUREAU
Office of the Director
EMB MC No. 2019-004
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ANNEX A
ADVANCE TRAINING MODULE ON AIR QUALITY MANAGEMENT

Topic 1: Salient Points of Republic Act 8749 (Philippine Clean Air Act), IRR, MCs and other updates

Objective: Provide Updates on Air Quality, including Air Shed Management, and Regulations

Sub-topics/Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Presentation of the salient points of the law including updates Related Administrative Orders: - JAO on ODS - Phil. National Standards for fuels - MC on installation of CCTV for in-house and interconnection with EMB - LGU initiatives - Financial incentives - Status of the airshed quality and updates on the Airshed Governing Board (as applicable)	90 mins
• Open Forum	10 mins

Topic 2: Stack and Ambient Air Monitoring

Objectives: Provide overview of stack and ambient air monitoring

Sub-topics/Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Stack monitoring for Industry and Air Quality Management	30 mins
• Observer's Checklist	5 mins
• Ambient Air Sampling and Monitoring	45 mins

Topic 3: Emission Inventory for Stationary, Mobile and Area Sources

Objective: Estimate air pollutants and monitor emissions

Sub-topics/Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Estimation and Calculations of Air Pollutant Emission for Stationary using AP 42 Model (Total Suspended Particles (TSP), Sulphur Oxides (SOx), Nitrogen Oxides (NOx), Volatile organic compounds (VOC), Carbon Monoxide (CO))	90 mins
• Estimation on Area Source and Mobile using AP 42 Model	60 mins
• Open Forum	10 mins

Topic 4: Pollution Control Technologies and Abatement Strategies

Objective: Understand the mechanism for cleaner production, pollution control and abatement

Sub-topics/Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Overview of Control, Cleaner Production, Design of APCF (Basic Design & Operation Principles of common air pollution control devices such as bag filter, air scrubber, electrostatic precipitator etc.) (Focus is on the APCD design and operation) Subtopics:	110 mins

- Fuel Quality	15 mins
- Cleaner Production, GHG	30 mins
- Control of Mobile Sources, Pollutants and Motorpool Management	30 mins
- Ambient Air Improvement Measures	30 mins
• Industry experience using Coal (based on GHG and TSP concerns), or Industry experience on the control of SOX, NOX, Particulates, whichever is applicable	60 mins
• Open Forum	15 mins

Topic 5: Continuous Automatic Ambient and Emission Monitoring

Objective: Understand the Monitoring Protocols and Procedures

Sub-topics/Key Concepts to achieve the learning Outcomes	**Duration (minutes)**
• Continuous Emission Monitoring Installation Protocols (CAMS/CEMS/RATA/CGA/ COMS), DAO 2007-22 (Reference)	40 mins
• Open Forum	10 mins

Topic 6: Principles and Guidelines in Air Dispersion and Modelling

Objective: Understand Air Dispersion Modelling

Sub-topics/Key Concepts to achieve the learning Outcomes	**Duration (minutes)**
• Air Dispersion Modelling	
Subtopics:	
- Overview of air dispersion modelling (MC 2008-003, Guidelines on Air Dispersion Modelling) including basic protocol on the installation of local weather station equipment	60 mins
- Meteorology, pathways, receptors dynamics	60 mins
- Relevance and application of air dispersion modelling	30 mins
• Open Forum	10 mins

Topic 7: Environmental Management Plan and Monitoring Plan on Air Emission

Objective: Prepare an EMP and EMoP on managing the impacts of air emissions given a pro-forma matrix

Sub-topics/Key Concepts to achieve the learning Outcomes	**Duration (minutes)**
• DAO 2000-81 is the IRR of Clean Air Act which defines the meaning of EMP	20 mins
• Workshop on EMP	45 mins
- The EMP matrix consists of activities, impacts and mitigation. This will serve as the framework workshop on EMoP.	
• The EMoP is a plan for monitoring air emissions at stack and ambient environment	25 mins
• Cost benefits analysis of the plan	20 mins
• Open Forum	10 mins

Topic 8: Plant Visits for Examples of Best Practices

Objective: For PCOs to gain exposure on best practices in air quality management (pollution control on stationary sources)

Sub-topics/Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Plant visit	240 mins
TOTAL NO. OF HOURS:	**20 Hours**

ANNEX B
ADVANCE TRAINING MODULE ON CHEMICAL MANAGEMENT

Topic 1: International Commitments on Multilateral Environmental Agreements And Local Regulations on Chemical Management

Learning Objectives:
At the end of the 5 hours session, the participants shall be able to:

- Review the International Commitments on chemical management
- Review local applicable regulations in terms of chemical management

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Overview of the Multilateral Environmental Agreements (MEAs) on chemical management	
- Rotterdam Convention (Prior Informed Consent Procedure)	15 mins
- Stockholm Convention (Persistent Organic Pollutants)	15 mins
- Minamata Convention (Mercury)	15 mins
- Montreal Protocol (Ozone Depleting Substances)	15 mins
- European Chemical Requirements (Registration, Evaluation, Authorization, Restriction for Chemicals (REACH), Restriction of Hazardous Substances (RoHS))	20 mins
• Overview of the local governing laws on chemical management	
- Philippine Drug Enforcement Agency (PDEA) Requirements	15 mins
- Philippine National Police (PNP) Requirements	15 mins
- Bureau of Customs (BOC) Requirements	15 mins
- Fertilizer and Pesticide Authority (FPA)	15 mins
- Department of Health- Food and Drug Administration (DOH-FDA)	15 mins
- Department of Labor and Employment - Basic Occupational Safety and Health (DOLE-BOSH)	15 mins
- Department of the Interior and Local Government - Bureau of Fire Protection (DILG-BFP)	15 mins
• Title II of Republic Act 6969 / DENR Administrative Order No. 1992-29 Brief Review and Updates on Chemical Management Policies	75 mins
- updates	
- Permitting	
- Monitoring and Reporting	

Topic 2: Strategic Approach to Chemicals Management

Learning Objectives:
At the end of this session, the participants shall be able to:

- Describe compliance to chemical management
- Industry adoption of less toxic chemicals for cleaner production

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Strategic Approach to Chemicals Management	40 mins
- Compliance	
- Adoption and use of less toxic chemicals through substitution or use of alternative chemicals	

Topic 3: Assessment of Chemicals

Learning Objectives:
At the end of the 3 hours session, the participants shall be able to:

- Describe the chemical management concepts
- Classify chemicals based on hazards and characteristics

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
Overview of the chemical management concepts	
• Characteristics, chemical identification and classification	
• Chemical Life Cycle Assessment	60 mins
- Hazards & risks	45 mins
- Health & Environment Aspects and Impact of Chemicals	
• Chemical Management Plan	20 mins
• Chemical Emergency Response Plan	20 mins
• National Institute for Occupational Safety and Health (NIOSH) Guide and Occupational Safety and Health Administration (OSHA) Guide	35 mins

Topic 4: DAO 2015-09 Safety Data Sheet and Labelling

Learning Objectives:
At the end of the 4 hours session, the participants shall be able to:

- Interpret the contents of Safety Data Sheet (SDS) and Globally Harmonized System (GHS) Labels
- Exhibit the skill in the application of SDS & GHS Label

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
DAO 2015-09 Safety Data Sheet and Labeling	
• Safety Data Sheets	30 mins
- 16 Section Format focused on Physical-Chemical Characteristics	
- Toxicological effects	
- Eco-toxicity effects	
• GHS labeling requirement	90 mins
- Pictograms	
- Signal Word	
- Hazard Statement	
- Precautionary Statement	
- Chemical Information	
- Supplier Information	
• Workshop on the development of GHS label and SDS	120 mins
- 16 sections of Safety Data Sheet	

Topic 5: Development of Chemical Management Plan

Learning Objectives:
At the end of the 5 hours session, the participants shall be able to:

- Discuss knowledge about chemical management in terms of handling, labelling, storage and use
- Prepare a chemical management plan in accordance with SDS
- Present the prepared chemical management plan

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Enhance knowledge on the preparation of chemical management plan - Chemical Handling - Chemical Labeling - Chemical Storage - Chemical Use • Preparation of chemical management Plan • Presentation of chemical management plan	60 mins 150 mins 90 mins

Topic 6: Online Permitting and Monitoring System (OPMS)

Learning Objective:
At the end of the 3 hours session, the participants shall be able to:

- Demonstrate the actual online application for permitting or registration and desk review monitoring

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Online Permitting and Monitoring System (OPMS) for Priority Chemical List (PCL) and Pre-Manufacture Pre-Importation Notification (PMPIN) - Procedure - Process - Actual Simulation	180 mins
Total No. of Hours	**20 Hours**

ANNEX C
ADVANCE TRAINING MODULE ON HAZARDOUS WASTE MANAGEMENT

Topic 1: International Commitments to Multilateral Environmental Agreements & Local Regulations on Hazardous Waste Management

Learning Objectives:
At the end of the 1.5 hours session, the participants shall be able to:
- Review the International Commitments in terms of hazardous waste management
- Review the requirements of DENR Administrative Order (DAO) 2013-22

Sub-topics / Key Concepts to achieve the learning Outcomes	**Duration (minutes)**
International Commitments on hazardous Waste management • Basel Convention	30 mins
Review of the local governing laws on hazardous waste management • Title III of RA 6969 : DAO 2013-22 - Updates - Permitting and other requirements - Monitoring and Reporting • Memorandum Circular 2017-11 (Exportation Clearance & Permit (ECC) Requirement for Importers of Recyclable Materials containing Hazardous Substances) • MC 2017-003 (Site Characterization Guidelines) • MC 2017-004 (Site Remediation Guidelines)	 30 mins 20 mins 10 mins

Topic 2: Discussion on the Hazardous Waste Management concepts

Learning Objectives:
At the end of the 5.5 hours session, the participants shall be able to:
- Identify the hazardous waste management concepts
- Identify and classify the hazardous wastes generated

Sub-topics / Key Concepts to achieve the learning Outcomes	**Duration (minutes)**
Discuss hazardous waste management concepts • Hazardous waste Identification and Classification • Segregation and Separation • Installing Placards and Labels • Safety Data Sheet • Storage, Handling, Transport & Disposal Requirements - Proper waste containers • Emergency Response Guidebook and Wiser Mobile Application • Emergency and Contingency and Response Plan • Proper Personal Protective Equipment (PPE) according to Hazard • Chemical or HW Spill Drill	 60 mins 20 mins 20 mins 20 mins 90 mins 45 mins 45 mins 30 mins

Topic 3: Different Types of Hazardous Waste Treatment & Technology options

Learning Objectives:
At the end of the 4 hours session, the participants shall be able to:
- Discuss the different types of hazardous wastes treatments
- Identify the types of hazardous waste treatments applicable to their workplace

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• MC 2016-002 (Technical Guidelines for Specific Categories of Treatment, Storage, and Disposal (TSD) Facilities) • Discussion of Different types of Hazardous Waste Treatment Technologies - Waste profiling - Different treatment options per hazardous waste classification - Possible In-house options	60 mins 120 mins 60 mins

Topic 4: Development of Hazardous Waste Management Plan

Learning Objectives:
At the end of the 4 hours session, the participants shall be able to:
- Prepare hazardous waste management plan
- Present the prepared hazardous waste management plan

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Preparation of a Hazardous Waste Management Plan • Presentation of established Hazardous Waste Management Plan	180 mins 60 mins

Topic 5: On-line Permitting and Monitoring System (OPMS)

Learning Objectives:
At the end of the 3 hours session, the participants shall be able to:
- Demonstrate the actual online application for permitting or registration applicable to hazardous wastes

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
Hazardous Waste Manifest System Online Registration Requirements in Securing: • Hazardous Waste Generator's ID • Permit to Transport and manifest • Importation Clearance for Recyclable Materials • Transporter Registration • TSD Registration	 35 mins 35 mins 35 mins 35 mins 40 mins

Topic 6: Pollution Adjudication Board (PAB) Cases on Hazardous Waste Management

Learning Objectives:
At the end of the 2 hours session, the participants shall be able to:
- Identify potential incidents that may lead to PAB Cases
- Enumerate the steps in handling PAB Cases

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
PAB Cases Discussion Management of PAB Case - What steps to take Appreciation of PAB Guidelines	30 mins 60 mins 30 mins
Total No. of Hours	**20 HOURS**

ANNEX D
ADVANCE TRAINING MODULE ON SOLID WASTE MANAGEMENT

Topic 1: Rationale and Policy Updates in Solid Waste Management

Learning Objectives:

- To discuss and review rationale of Solid Waste Management (SWM) in the industries
- To discuss and review relevant policy issuances on Solid Waste Management
- To present situationer on SWM

Sub-topics/Key Concepts to achieve the learning Outcomes	Duration (minutes)
Introduction to Solid Waste Management • Rationale of SWM in the industries and Local Government Unit (LGU); Environmental and Health consequences of poor Integrated Solid Waste (ISW) Management	30 mins
Policy Updates on Republic Act (RA) 9003 • RA 9003 and its association with other national policies and local ordinances: - DENR Administrative Order (DAO) 2001-34 Implementing Rules and Regulations (IRR) of RA 9003 - DAO 2006-09 Closure of Open Dumpsites (OD)/ Controlled Dump Facilities (CDF)) - DAO 2006-10 Categorized Sanitary Landfills (SLF)) - DAO 1997-28 Importation of Recyclable Materials - DAO 2016-06 Alternative Fuels and Raw Materials for Cement Kiln - JAO 2006-01 Environmental Technology Verification (ETV), Search for Model Barangay - Approved Resolutions of National Solid Waste Management Commission (NSWMC) (Nos. 8, 9, 10, 13, 15, 16, 17, and 18) - Other institutional arrangements (i.e. Disaster Risk Reduction and Management (DRRM) Act of 2010, Kyoto Protocol, Basel Convention)	90 mins
SW Situationer • Trends in Establishment of SWM Facility, (i.e. SLF, Materials recovery facility (MRF), etc.)	30 mins
Roles of the DENR, NSWMC members and LGUs in the implementation of RA 9003 • National Program on Solid Waste Management (SWM) of the LGU, LGU-SWM Self-Compliance Monitoring and Auditing Report, SWMO structure and contact details, local ordinances, LGU best practices or model LGU and prohibited acts	60 mins

Topic 2: Opportunities and Challenges on Waste to Energy Projects

Learning Objectives:

- PCOs to be knowledgeable on the opportunities and challenges in the operation of Waste to Energy Projects

Sub-topics/Key Concepts to achieve the learning Outcomes	Duration (minutes)
• SWM System - Waste Analysis and Characterization Study (WACS): Generation and composition of SW	90 mins

- Waste avoidance (initiatives by various sectors) - Storage - Collection - Transfer and Transport - Processing and Recovery (MRF, management of biodegradables, recyclables) - Residuals Management	
• Overview of Recyclable Technologies - Recycling Technologies - Other SWM processes and technologies → Biomass technologies (briquette production, bioreactor technology) → Co-processing	60 mins
• Policies on Waste to Energy • Technologies with Environmental Technology Verification (ETV) - Thermal Processors - Controlled steam generation	30 mins 30 mins

Topic 3: Implementing a Successful SWM in the Industries

Learning Objectives:

- PCOs to be able to perform Waste Analysis and Characterization Study (WACS) of solid waste generated
- PCOs to establish and assess SWM system and procedures on recording, monitoring (chain of custody) and reporting of SW generated.

Sub-topics/Key Concepts to achieve the learning Outcomes	**Duration (minutes)**
SW description, characterization and classification of commonly generated by industries - Principles of WACS; - How to conduct WACS	90 mins
SW segregation, collection, storage and handling - Basic requirements in the design and operation of MRFs for industries	90 mins
SW transport, treatment and/or disposal - SW treatment options, protocols in hauling and disposal; Sludge handling	60 mins
SW reporting and monitoring - Activities and tools for record keeping and reporting	30 mins
SW diversion	15 mins
SW assessment - Discuss how data on SW generation and SW Management is discussed in the SMR	15 mins

Topic 4: Introduction to Life Cycle Analysis of (LCA)

Learning Objectives:

- PCOs to be knowledgeable on the result of the LCA of certain packaging materials

- To determine contribution to the waste streams of both plastic and paper, as main solid waste types in the Philippines.

Sub-topics/Key Concepts to achieve the learning Outcomes	Duration (minutes)
Concepts of Life Cycle Analysis of (LCA) - Goals and purpose of LCA - Key concepts of life cycle impact assessment	30 mins
Comparative LCA of Plastic and Paper • Environmental Impacts of Producing and Using Plastics and Paper - Resource Use - Manufacturing - Re-use / Recycle	60 mins

Topic 5: Approaches to SWM in the Industries

Learning Objective:

- PCOs to identify ways to manage and control (minimize, handle, store and dispose) the SW generated.

Sub-topics/Key Concepts to achieve the learning Outcomes		Duration (minutes)
Prevention – Waste Avoidance and Minimization • 5S • Inventory Management • Improved Operations • Product/ equipment / process /packaging modification • Use of reusable against disposable material		60 mins
Waste Recovery Technologies	• Internal recycling (closed-loop) • External recycling (waste exchange, recycling offsite)	30 mins
	• Composting technologies • Recycling technologies • Community-based projects	30 mins

Topic 6: Workshop on Cleaner Production and Waste Minimization and Updating of SWMP

Learning Objectives:

- PCOs to be able to characterize, classify and quantify solid waste generated in their respective operations
- PCOs to assess current SWM practices and update their SWM Plan

Sub-topics/Key Concepts to achieve the learning Outcomes	Duration (minutes)
Workshop on Cleaner Production and Waste minimization • CP Options Tree	60 mins
Workshop on Material Flow Analysis • Sankey diagramming	30 mins
Workshop on Updating and rewriting of the SWM Plan • Updating of the SWMP, Updating of Environmental Management Plan (EMP) and/or Environmental Monitoring Plan (EMoP)	60 mins

Presentation of CP best Practices • Benchmarking and application of best practices	60 mins

Topic 7: Plant Visit

Learning Objective:

- For PCOs to gain exposure on actual and effective implementation of SWM

Sub-topics/Key Concepts to achieve the learning Outcomes	**Duration (minutes)**
Best practices • Presentation of offsite facility by a model company	60 mins
Total No. of Hours	**20 Hours**

ANNEX E
ADVANCE TRAINING MODULE ON WATER AND WASTEWATER MANAGEMENT

Topic 1: Updates on Republic Act (RA) 9275 (Clean Water Act), DENR Administrative Order (DAO) 2005-10, DAO 2016-08 (Water Quality Guidelines and General Effluent Standards)

Learning Objectives:
At the end of the session the participant shall:

- Be able to enumerate and discuss the updates and apply/comply those relevant to the workplace

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• RA 9275/DAO 2005-10	20 mins
• DAO 2016-08	30 mins
• Open Forum	10 mins

Topic 2: Philippine National Standards for Drinking Water (PNSDW), Implementing Rules and Regulations (IRR) of Chapter 2-Water Supply of Presidential Decree (PD) 856 (Code on Sanitation), and National Sewerage and Septage Management Program, Situationer on Water Bodies/Water Quality Management Area (WQMA)/Sewerage Systems in the Philippines

Learning Objectives:
At the end of the session the participant will:

- Be able to visualize and discuss the current state of the Philippine water bodies.
- Must be able to enumerate and discuss/ describe the requirements of the Philippine National Standards for Drinking Water, IRR of Chapter 2 of PD 856, and apply/comply those relevant to the organization

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• PNSDW, IRR of Chapter 2-Water Supply of PD856 (Code on Sanitation)	20 mins
• National Sewerage and Septage Management Program	15 mins
• Situationer on Water Bodies/WQMA/Sewerage Systems in the Philippines	20 mins

Topic 3: National Water Resources Board (NWRB) Policies/Regulations/Permits

Learning Objectives:
At the end of the session the participant will:

- Be able to explain and describe the latest updates on NWRB policies, regulations, permits.

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• NWRB Policies and Regulations	30 mins
• Permitting	15 mins

Topic 4: Water and Wastewater Characterization - Stream Identification, Flow Measurement, Sampling (Sampling and Monitoring Plan-Methods, Parameters, Budget)

Learning Objectives:
At the end of the session the participant will:

- Be able to discuss the process in the characterization of waste water or effluent.
- Be able to explain the process in the conduct of water and waste water sampling.

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Water and Wastewater Characterization - Stream Identification, Flow measurement and Material Balance	30 mins
• Sampling (Sampling and Monitoring Plan-methods, parameters, Budget)	60 mins

Topic 5: Overview of Wastewater Treatment, Flow Measurements, Collection and Disposal Systems; Basic Wastewater Treatment Practices: Physical, Biological, and Chemical

Learning Objectives:
At the end of the session the participant will:

- Be able to discuss the basic principles of different waste water treatment technologies.
- Be able to explain and differentiate the existing practices of managing and disposal of wastewater.

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Overview of Wastewater Treatment	10 mins
• Flow Measurements	15 mins
• Collection and Disposal Systems	15 mins
• Basic Wastewater Treatment Practices – Physical – Biological – Chemical Examples: Grease traps, Septic Tank, Imhoff Tanks, Reed Beds etc.)	50 mins

Topic 6: Cleaner Production and Pollution Prevention (Wastewater Minimization)

Learning Objectives:
At the end of the session the participant will:

- Be able to discuss and differentiate the existing practices of managing and disposal of wastewater
- Be able to explain common water minimization schemes.

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Cleaner Production, Pollution Prevention (Wastewater Minimization Initiatives, Techniques and Approaches) +Natural wastewater prevention	60 mins

Topic 7: Physical and Chemical Treatment Process for Industrial Wastewater

Learning Objectives:
At the end of the session the participant will:

- Be able to identify, discuss and describe water and wastewater treatment technologies, appropriate to the work place.

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Physical Treatment Processes Pretreatment	35 mins

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
(Equalization, settling, fats, oil and grease (FOG) removal etc.) • Industrial Chemical Treatment Processes Examples: Coagulation, Flocculation, Precipitation, Filtration, Jar Test, Etc. +Dissolved air flotation	60 mins

Topic 8: Biological Treatment Process -Aerobic, Anaerobic and Nutrient Removal (Optimizing Treatment Process)

Learning Objectives:
At the end of the session the participant will:

- Be able to identify, discuss and apply water and wastewater treatment technologies, appropriate to the work place.

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Role of Microorganisms in Wastewater Treatment	20 mins
• Biological Treatment Process (Aerobic)	40 mins
• Biological Treatment Process (Anaerobic and Nutrient Removal)	40 mins

Topic 9: Plant Visit for Examples of Best Practices (Including Treatment Facility Operation, Preventive Maintenance and Trouble Shooting)

Learning Objectives:
At the end of the session the participant will:

- Be able to visualize and discuss the process of the actual wastewater treatment facility visited and industry best practice presented.

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Assembly of participants/entrance conference	30 mins
• Courtesy call with plant executives	15 mins
• Briefing	15 mins
• Actual field visit	105 mins
• Exit Conference	15 mins

Topic 10: Operation and Maintenance of Wastewater Treatment Facilities (WWTF)

Learning Objectives:
At the end of the session the participants will:

- Be able to discuss the operation and maintenance of Wastewater Treatment Facility (WTF) or Sewage Treatment Plant (STP).

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Operation and Maintenance of Conventional Activated Sludge (CAS) WWTF	15 mins
• Operation and Maintenance of Sequential Batch Reactor (SBR) WWTF	15 mins
• Operation and Maintenance of Rotating Bio-contactor (RBC) WWTF	15 mins

• +Common Troubleshooting of WWTF	15 mins
• +Pollution Control Officer's (PCOs) Guidelines in Accepting Turnover of WWTF from a Contractor	15 mins
• FAQ in WWTF Operations and Maintenance	15 mins

Topic 11: Sludge Management / Fog Management/Land Discharge of Wastewater

Learning Objectives:
At the end of the session the participant will:

- Be able to understand, discuss and differentiate the existing practices of managing and disposal of sludge and FOG.

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Sludge and FOG Management	30 mins
• Re-use of wastewater for irrigation and other agricultural uses	40 mins

TOPIC 12: Case Study: Physical/Industrial Chemical Treatment Process / Biological Treatment Process

Learning Objectives:
At the end of the session the participant will:

- Be able to discuss the Physical/Industrial Chemical Treatment Process / Biological Treatment Process of waste water treatment technologies, appropriate for case study provided

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Provide case studies to participants formed into groups	10 mins
• Analyze and group discussion/brainstorming	30 mins
• Development of strategies/solution of the case	20 mins
• Presentation/Critiquing	60 mins
• +Situations to expect with presence of different microorganisms	
Case handling:	
• Actual water pollution case (situations and resolved as acceptable with Environmental Management Bureau (EMB)	

Commented [U1]: Should be included in the Basic PCO Training

Topic 13: Discussion and Workshop on the Development of Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP)

Learning Objectives:
At the end of the session the participant will:

- Be able to formulate water and waste water environmental management and monitoring plan applicable to the establishment.

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Grouping of Participants and Introduction	5 mins
• Reuse and Recycling Opportunities, Rainwater Collection	20 mins
• Environmental Cost Accounting	
• Provide EMP and EMoP Framework	20 mins
• Analyze and group discussion/brainstorming	10 mins
• Development of EMP	20 mins

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration (minutes)
• Development of EMoP • Samples and Synthesis	40 mins 20 mins 10 mins
Total No. of Hours	**20 Hours**

ANNEX F
ADVANCE TRAINING MODULE ON CLIMATE CHANGE ADAPTATION AND MITIGATION

The advance training module on climate change will provide an overview on climate change adaptation and mitigation and develop the skills of the Pollution Control Officers on the conduct of a greenhouse gas (GHG) emissions inventory based on the GHG Protocol Standard and the 2006 IPCC Guidelines. The GHG inventory training will cover emission sources from mobile and stationary combustion, purchased electricity, business air travel, wastewater treatment and discharge, solid waste management and fugitive emissions from refrigeration and air-conditioning equipments. In addition to lectures on the concept and methodology, there will be workshop exercises that will follow for the participants to have practical and hands-on application. The module will also provide guidelines on setting GHG reduction target and tracking emissions over time to encourage and promote management of their GHG emissions.

The teaching method will be a mix of both lecture and practical activities such as eco-mapping i.e. emission sources identification, data gathering and calculations. To maximize their learning and make the computations more practical and realistic, participants are encouraged to bring documents relevant to:

1) Organizational structure of the corporation showing various companies/subsidiaries (if any)
2) List of facilities and operations in each facility (i.e. Operational processes: process flow control chart and/or facility layout)
3) Set of equipment that uses fossil fuels,
4) Invoice of fuel purchases and/or fleet data (company vehicles and leased vehicles)
5) Chemical and bio-chemical processes undertaken in the facilities that produces GHG
6) Purchased power (electric bills) and
7) Water consumption, wastewater treatment and BOD
8) Solid waste generation and management
9) Data or information on business travels, employees commute, etc.

Topic 1: Overview, Updates and Policy and Legal Framework on Climate Change

Learning Objectives:
At the end of the session, the participants shall be able to:

- Understand the basic concepts of climate change and recognize the links between climate change and greenhouse gases
- Identify the impacts of climate change to major sectors and look at the evidences and observed climate change
- Gain awareness on the global and national climate change policies and programs

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration
• Introduction to Climate Science and Climate Change	40 mins
• Climate Change Evidences and Impacts to People and Environment	40 mins
• Global Response to Climate Change (UNFCCC, Kyoto Protocol, Paris Agreement)	40 mins
• Climate Change Policies and Programs (RA 9729, RA 10174, NFSCC, NCCAP)	40 mins

Topic 2: Overview on Climate Change Adaptation and Disaster Risk Reduction

Learning Objectives:
At the end of the session, the participants shall be able to:

- Learn and understand the links between ecosystems, climate change adaptation and disaster risk reduction and sustainable livelihoods.
- Increase awareness on the multiple benefits provided by ecosystems for risk reduction, climate change mitigation and adaptation, and sustainable development.

- Facilitate cross-sectoral collaboration between environmental management, DRR, climate change and development actors.

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration
• Fundamentals on Ecosystems and Ecosystem Services	30 mins
• Introduction to Ecosystem-based Adaptation (EbA)	45 mins
• Introduction to Ecosystem-based Disaster Risk Reduction (Eco-DRR)	30 mins
• Ecosystem –based Approaches related to Eco-DRR and EbA	30 mins
• Mainstreaming Ecosystem-based Approaches in the Philippines	40 mins

Topic 3: Pre-Training Assessment on GHG Inventory and Management

Learning Objectives:
At the end of the session, the trainer shall be able to:
- Assessed the knowledge of the participants and the level of interest
- Identify and stock take the level of initiatives and efforts of the participating establishment

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration
• Sharing of Expectations to the Training	10 mins
• Stocktaking of Ongoing or Plan Initiatives on GHG Accounting and Management	15 mins
• Simple Computation: (Carbon footprint to come to training)	20 mins

Topic 4: Overview on Entity-Level Greenhouse Gas Inventory

Learning Objectives:
At the end of the session, the participants shall be able to:
- Be familiar with the GHG accounting guidelines and methodologies
- Identify sources of emissions and classify into different scopes

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration
• Introduction to GHG Inventory (Overview and Benefits)	45 mins
• Overview of the GHG Protocol Standard and the 2006 IPCC Guidelines	30 mins
• Defining GHG Boundaries (Organizational and Operational)	30 mins
• Classifying GHG Emission Sources (Direct and Indirect, Scopes 1,2&3)	30 mins
• Overview of the GHG Management Framework (Principles and Steps)	30 mins

Topic 5: Calculating Greenhouse Gas Emission from Various Sources (mobile and stationary combustion, purchased electricity, business air travel, wastewater treatment and discharge, solid waste management and fugitive emissions from refrigeration and air-conditioning equipments)

Learning Objectives:
At the end of the session, the participants shall be able to:
- Understand how GHG are emitted from the various sources
- Be familiar with the methodologies and equations
- Identify the activity data and appropriate emission factors
- Perform sample calculations on the various emission sources (workshop)

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration
• Estimating Emissions from Mobile and Stationary Combustion	80 mins
• Estimating Emissions from Purchased Electricity	60 mins
• Estimating Emissions from Business Air Travel	80 mins

• Estimating Emissions from Wastewater Treatment and Discharge	80 mins
• Estimating Emissions from Solid Waste Management	80 mins
• Estimating Fugitive Emissions from RAC Equipments	80 mins

Topic 6: Setting Target and Tracking Emissions over Time

Learning Objectives:
At the end of the session, the participants shall be able to:

- Be familiar with the different type of targets
- Understand how to set and decide on GHG targets

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration
• GHG Emission Reduction Targets	40 mins
• Steps in Setting Targets	40 mins
• Examples of GHG Reduction Targets	30 mins

Topic 7: Greenhouse Gas Reduction Opportunities

Learning Objectives:
At the end of the session, the participants shall be able to:

- Learn best practices on GHG management
- Understand the benefits of managing GHG emissions
- Identify GHG reduction measures

Sub-topics / Key Concepts to achieve the learning Outcomes	Duration
• Identify GHG Reduction Opportunities	40 mins
• Benefits of Reducing GHG Emissions	30 mins
• Sample Best Practices on GHG Management	30 mins
TOTAL NO. OF HOURS:	**20 Hours**

ANNEX G
ENVIRONMENTAL MANAGEMENT TRAINING MODULE
FOR SMALL AND MEDIUM ENTERPRISES

Covered Sectors: Small and Medium Enterprises (SMEs)

Training Objectives:

- Equip participants with updates on environmental management regulations and compliance requirements
- Enhance knowledge on environmental and wastes management
- Develop skills on cleaner production and waste minimization
- Enhance knowledge on Best Available Technology (BAT)/Best Environmental Practice (BEP) strategies in waste management

MODULE DELIVERY PLAN

Sub-topics/Key Concepts to achieve the learning Outcomes	**Duration (minutes)**
Updates on Environmental Regulations (Underscore the most relevant regulation(s)	60 mins
Types and Description of Wastes and Environmental Releases from the Sector	60 mins
Introduction/Overview of Various Environmental/ Waste Management Tools • Life Cycle Analysis • Greening the Supply Chain • Sustainable Consumption	120 mins
Cleaner Production and Waste Minimization Options for the Sector • Process Modification • Reuse and Recycling • Materials Substitution • Good Housekeeping and Proper Maintenance and Operation	120 mins
BAT/BEP in Chemicals Management (Underscore the most relevant to the Sector)	60 mins
BAT/BEP in HW Management (Underscore the most relevant to the Sector)	60 mins
BAT/BEP in Abating Pollution (Underscore the most relevant to the Sector)	60 mins
Caseworks: Preparation of Environmental Protection Enhancement Plan	60 mins
Introduction to the Climate Change Act of the Philippines, National Climate Change Action Plan, and EO 174 Series of 2014	120 mins
Source Inventory of ODS/GHG from Wastes	150 mins
Caseworks: Preparation of ODS/GHG Inventory from Wastes	150 mins
Caseworks: Preparation of Environmental Protection Enhancement Plan	180 mins
Total No. of Hours	**20 Hours**

ANNEX H
HAZARDOUS WASTE MANAGEMENT AND EMERGENCY RESPONSE TRAINING FOR TELECOMMUNICATIONS, GASOLINE STATIONS, AND OTHER RELATED SMALL AND MEDIUM INDUSTRIES

Covered Sectors: Telecommunications, gasoline stations, and other related Small and Medium Enterprises

Training Objectives:

- Equip participants with updates on hazardous waste management regulations and compliance requirements
- Discuss ways on managing hazardous waste generated by the telecommunications industry
- Orient participants on the use of the Online Hazardous Waste (HW) Tracking System (www.philhazwastetracksys.com)
- Inform participants of response measures during emergency or medical and hazardous waste incidents

MODULE DELIVERY PLAN

Sub-topics/Key Concepts to achieve the learning Outcomes	**Duration (minutes)**
Updates on Regulatory Framework of Hazardous Waste (HW) Management	105 mins
Types and Classification of HW Generated in Telecommunication Industry (or specific to the target sector)	120 mins
Online HW Tracking System (Registration and Manifest System)	150 mins
Handling, Packaging, Labelling, Storage and Transport of HW Generated in Telecommunication Industry	120 mins
Treatment and Disposal Options	105 mins
Overview of Emergency Response	120 mins
Preparation of Emergency Response and Contingency Plans	150 mins
Response, Clean up, Recovery, and other Post Response Activities involving HW Incidents	150 mins
Casework/ Table Top Exercise: Emergency Response Scenarios	180 mins
Total No. of Hours	**20 HOURS**

ANNEX I
MEDICAL AND HAZARDOUS WASTE (HW) MANAGEMENT AND EMERGENCY RESPONSE TRAINING FOR HEALTHCARE FACILITIES

Covered Sectors: Hospitals and Medical Clinics

Training Objectives:

- Equip participants with updates on medical and hazardous waste management regulations and compliance requirements
- Discuss ways on managing medical and hazardous waste generated by healthcare facilities/industry
- Orient participants on the use of the Online Hazardous Waste Tracking System (www.philhazwastetracksys.com)
- Inform participants of response measures during emergency or medical and hazardous waste incidents

MODULE DELIVERY PLAN

Sub-topics/Key Concepts to achieve the learning Outcomes	**Duration (minutes)**
Legal Framework of Medical and HW Management (focus on DAO 2013-22)	105 mins
Types and Classification of Medical and HW Generated in Healthcare Facilities	120 mins
Regulatory Requirements for HW including Online HW Tracking System (Registration and Manifest System)	150 mins
Handling, Packaging, Labelling, Storage and Transport of HW Generated in Hospitals and Medical Clinics	120 mins
Treatment and Disposal Options	105 mins
Overview of Emergency Response	120 mins
Preparation of Emergency Response and Contingency Plans involving Medical and HW Incidents in Healthcare Facilities	150 mins
Responding to Medical and HW Incidents in Healthcare Facilities	150 mins
Casework/ Table Top Exercise: Emergency Response in Healthcare Facilities	180 mins
Total No. of Hours	**20 Hours**

ANNEX J
SECTOR-SPECIFIC POLYCHLORINATED BIPHENYLS AND EMERGENCY RESPONSE TRAINING

Covered Sectors: Owners of power distribution and transmission equipment possibly containing Polychlorinated Biphenyl (PCBs)

Training Objectives:

- Enhance PCOs' knowledge and skills in:
  - → Identifying and managing transformers, capacitors, and other oil-containing electrical equipment that may contain PCBs for the protection of human health and the environment
  - → Preventing transformers, capacitors, and other oil-containing electrical equipment from being contaminated with PCBs during maintenance and other related activities
  - → Responding to emergencies involving PCBs to ensure that negative impacts are immediately mitigated
- Enable establishments to comply with DENR Administrative Order 2004-01: Chemical Control Order for PCBs, which requires establishments to provide appropriate trainings to all personnel exposed to PCBs

MODULE DELIVERY PLAN

Sub-topics/Key Concepts to achieve the learning Outcomes	**Duration (minutes)**
Introduction to PCBs	120 mins
Updates on PCBs Regulatory Requirements including the use of the Online PCBs Registration	60 mins
Identification and Inventory of PCBs and PCBs-containing Equipment and Wastes	90 mins
Handling, Packaging, Labelling, Storage and Transport of PCBs and PCBs-containing Equipment and Wastes	120 mins
Environmentally Sound Treatment and Disposal of PCBs and PCBs-containing Equipment and Wastes	120 mins
PCBs Management Plan Preparation, Implementation and Monitoring	90 mins
Overview of Emergency Response	120 mins
Personal Protective Equipment	120 mins
Responding to PCBs Incidents	180 mins
Table Top Exercise on Responding to PCBs Incidents	180 mins
Total No. of Hours	**20 Hours**