



Republic of the Philippines  
**DEPARTMENT OF ENERGY**  
(Kagawaran ng Enerhiya)

**DEPARTMENT CIRCULAR NO. DC2021-06-0020**  
**BIOMASS AND BIOFUELS SAFETY, HEALTH AND ENVIRONMENT CODE OF PRACTICE**

**WHEREAS**, pursuant to Rule 2, Section 8 of Department Circular No. DC2012-11-0009, otherwise known as the "Renewable Energy Safety, Health and Environment Rules and Regulations (RESHERR)", and in order to ensure adequate safety and protection against the hazards to health, life, property, as well as pollution of air, land and water from Renewable Energy (RE) Operations, the following Biomass and Biofuels Safety, Health and Environment Code of Practice are hereby promulgated.

**GENERAL PROVISIONS**

**Section I. Safety, Health and Environment Policy Statement**

1. It shall be the primary responsibility of the Employer to provide a safe workplace while protecting the health of the Workers and the surrounding environment. To achieve this, safety, health and environmental concerns must be thoroughly integrated in the Employer's management policy.
2. The Employer, as a matter of policy, shall:
  - a. Issue a general safety, health and environment policy statement in writing in accordance with Rule 3, Section 9 of RESHERR;
  - b. Give importance to the safety, health, and environmental aspect of their operation by creating a safety, health and environment committee under the direct supervision of top management;
  - c. Establish a system to implement and monitor compliance of their contractors and sub-contractors to safety, health and environmental policy and related requirements of the company;
  - d. Implement programs with corresponding budget allocation to ensure that relevant government safety, health and environmental rules, regulations and codes are complied with; and
  - e. Establish an Emergency Preparedness and Disaster Management Plan to address any incident that may pose serious and imminent danger to the company's Workers, the environment and the community.

**SECTION II. Definition of Terms**

Terms and expressions that are generally defined in other existing regulations or in the Occupational Safety and Health Standards (OSHS) shall have the same meaning in this Department Circular. For purposes of this issuance, however, the following terms shall be defined as follows:

21

1. **Authorized Personnel** – refers to a Worker who has been trained and/or licensed/certified to do the task, as duly authorized by the Employer;
2. **Bureau** - refers to the Renewable Energy Management Bureau (REMB) of the Department of Energy;
3. **Confined Space** – refers to any area that has hazardous atmosphere, with restricted means for entry and exit and/or not designated for continuous worker occupancy;
4. **Employer** – refers to the principal employer, service/operating contractor referred to in a RE Service/Operating Contract, and other contractors or subcontractors , engaged in RE Operations, natural or judicial, whether acting alone or in consortium with others, who directly or indirectly benefits from the services of the Employees;
5. **Environment** – refers to the Workplace Environment as provided for in OSHS;
6. **Procedure** – refers to a formal step-by-step instruction describing how a specific task or work activity should be done;
7. **Program** – refers to a plan under which action may be taken toward a goal;
8. **SDS** – refers to Safety Data Sheet, which is intended to provide workers and emergency personnel with procedures for handling or working with a substance in a safe manner, and includes information such as physical data (melting point, boiling point, flash point, etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill-handling procedures.
9. **Standard** – refers to specifications or guidelines on how things should be done;
10. **System** – refers to an organized scheme of how things are done; includes procedures, policies describing how an organization works; and
11. **Worker**- refers to any member of the labor force, regardless of employment status.

### **SECTION III. Safety, Health And Environment Practices**

The Employer is required to formulate and implement a Safety and Health Program which shall be in consonance with the provisions of Republic Act (RA) No. 11058. The Employer shall prepare and allocate a budget to implement the Safety and Health Program. The Safety and Health Program shall include, among others, the following safety measures:

## **A. General Safety**

### **1. Office Safety**

- a. An office maintenance and housekeeping program shall be in place, in accordance with Section III.A.3 hereof;
- b. Horse playing shall be prohibited within company premises;
- c. Only Authorized Personnel shall operate equipment and appliances;
- d. Electrical equipment and appliances shall be immediately shut-off when not in use;
- e. Smoking shall only be allowed in the designated smoking area; and
- f. An ergonomics program shall be in place to address potential ergonomics hazards from work procedures to minimize stress to the musculo-skeletal system to prevent repetitive stress injury.

### **2. Personal Protective Equipment (PPE)**

- a. Employer shall have a PPE program in place;
- b. Employer shall provide adequate PPE available at all times, in conformity with the approved design and specification appropriate for the exposure and the work to be performed that meets at least the minimum OSHA requirements or applicable industry standards such as ANSI, ASTM, etc. and shall bear no cost to Workers;
- c. Workers shall be properly trained on the selection (fit-test), use, storage and maintenance of approved PPE;
- d. All work activities/workplaces requiring the use of PPE shall be identified;
- e. Employer shall communicate to concerned Workers the use of the required PPE. Adequate signs/warnings shall be posted in areas requiring PPE;
- f. PPE shall be inspected regularly and properly maintained to its good condition. Use of defective/damaged PPE is prohibited;
- g. All Workers shall comply with PPE requirements in accordance with Section III.A.2 hereof;
- h. Hard hat shall be worn in designated "HARD HAT AREA";
- i. Appropriate eye protection shall be worn while handling chemicals, while in areas or activities with exposure to dusts, or any operations that can cause eye injuries;

- j. Face shields shall be worn as protection against flying particles, sprays or hazardous liquid, splashes of molten metals and hot solution;
- k. Appropriate hearing protection shall be worn in areas where the noise level reaches 85 decibels and above for 8-hour exposure;
- l. Appropriate respiratory protection shall be worn in areas where air-borne contaminants such as toxic materials, fogs, gases, fumes, mists, sprays or vapor and dusts are present;
- m. Appropriate gloves shall be worn when handling toxic materials and working on energized electrical circuit or apparatus;
- n. When performing hot works, appropriate PPE shall be worn such as but not limited to welding masks, respirator, gloves, aprons and leggings designed for heat protection. Head protection shall be worn when necessary;
- o. All Workers exposed to extreme temperatures shall wear appropriate PPE in accordance with Section III.A.2 hereof;
- p. Full body harness and/or lifelines shall be properly worn while working at heights 6 feet (2 meters) or more above ground in pits, tunnels, ducts and other confined spaces. Lifelines shall be securely fastened/anchored while in use; and
- q. Safety shoes shall be worn in areas where they are required.

### 3. **Housekeeping**

Employers shall devise procedures or guidelines for the following in accordance with existing laws and regulations:

- a. Obstructions (i.e., passageways, aisles, ingress and egress);
- b. Domestic and process waste management (i.e., generation, collection, segregation, storage and disposal);
- c. Storage and stacking of materials, tools and equipment;
- d. Signage (directional/instructional);
- e. Barricades and zoning;
- f. Building and ground maintenance of offices and field facilities;
- g. Pest and rodent control; and
- h. Control for stray animals.

#### 4. Laboratory Safety

- a. All chemicals, sample containers and generated wastes shall be properly handled, stored, labeled and dispose in accordance to RA No. 6969 also known as the *"Toxic Substances and Hazardous and Nuclear Waste Control Act of 1990"*;
- b. The SDS of all chemicals and/or Hazardous Materials in storage or in use shall be made available for reference at all times;
- c. Applicable chemicals and reagents used in the laboratory shall have the permits and licenses from regulatory bodies (i.e., Department of Environment and Natural Resources - Environmental Management Bureau, Philippine National Police, Philippine Drug Enforcement Agency etc.);
- d. Safe work procedures for the following task shall be provided and reviewed/evaluated periodically:
  - i. Geoscientific and Environmental Sampling;
  - ii. Field Data and Sample Gathering;
  - iii. Laboratory Analysis;
  - iv. Laboratory Instrument Operation;
  - v. Chemical Handling; and
  - vi. Waste Collection, Storage, Transport, Treatment and Disposal.
- e. All work involving hazardous and volatile materials shall be done in the fume hood;
- f. Smoking is strictly prohibited in the laboratory area;
- g. Compressed gas cylinders shall be stored, transported and handled in accordance with Section III.M hereof;
- h. All instrument plugs, cables and power outlets shall be labelled with their corresponding power ratings;
- i. Eye wash stations and emergency showers shall be available in designated areas and regularly maintained; and
- j. Laboratory Instruments should be calibrated based on Operating Manual.

#### 5. Safety Signage

Safety signage and devices shall be posted in prominent positions at strategic locations in a language understandable to all, and in accordance with the provisions of RA No. 1058 and its Implementing Rules and Regulations.

## **6. Duties and Responsibilities of a Safety Officer / Personnel**

- a. Oversee the overall management of the safety, health and environment program;
- b. Frequently monitor and inspect safety, health and environment aspect of the operation being undertaken with the participation of supervisors and workers;
- c. Assist government inspectors in the conduct of safety, health and environment inspection and/or during the conduct of an accident investigation; and
- d. Issue work stoppage orders when necessary based on the requirements and procedures provided by the OSHS.

## **7. Safety Orientation**

All visitors, and contractors must be complete a site specific safety induction to be aware of all safety rules and regulations and emergency procedure applicable to the worksite.

## **8. Buddy System**

- a. Employer shall implement the buddy system to high risk activities such as but not limited to the following:
  - i. working at heights;
  - ii. working with electricity;
  - iii. working at confined spaces;
  - iv. working with hazardous equipment;
  - v. working with materials at great pressure;
  - vi. working with public where there is potential for violence;
  - vii. working with various kinds of terrain; and
  - viii. working with bodies of water
- b. Where lone working with high risk is required, staff should ensure they have another colleague aware of their movements. To operate the buddy system, the employer shall assign a buddy. This is the person who is the contact for the period in which the said staff is working alone. The assigned buddy shall be:
  - i. be fully aware of the movements of the lone Worker;
  - ii. have all necessary contact details for the lone Worker, including next of kin;
  - iii. have details of the lone Worker's known breaks or rest periods;
  - iv. attempt to contact the lone Worker if they do not contact the buddy as agreed;

- v. follow the agreed local escalation procedures for alerting their senior manager and/or police if the lone Worker failed to contact the buddy within agreed and reasonable timescales; and
- vi. contingency arrangements shall be in place for someone else to take over the role of the buddy in case the assigned person is unavailable.

## **9. Worker Training**

- a. All Employers shall ensure that personnel attend a fit for purpose Safety training. This training maybe conducted by the DOLE, DOLE accredited Safety Practitioners or DOLE accredited Safety Consultants.
- b. Where applicable, TESDA training and certifications, shall be required for special kind of works (i.e. Electrician, Scaffold Erector, Rigger Crane Operator etc).

## **B. Safety, Health and Environment Plan**

Safety, Health and Environment (SHE) planning begins with anticipating and understanding health, environment and safety hazards in the workplace and assessing consequent risks and opportunities to protect people, the environment and the business. Risks are addressed by levels of management appropriate to the nature and magnitude of the risk. The early recognition, identification and understanding of applicable laws and regulations, stakeholder expectations and emerging issues during the business planning phase are helpful in evaluating risks and opportunities.

- a. Prior to the performance of work, Employer shall submit a SHE Plan, duly signed by the Project Manager and specific to the project. The SHE Plan shall describe the safety, health and environmental issues and risks associated with the work;
- b. SHE Plan shall be based on, and comply with, applicable laws, decrees, administrative rules and regulations, relevant Employer policy and operating procedures, and relevant best practices;
- c. If a SHE Plan is required by local regulations, Employer shall not start work without an SHE Plan that has been accepted by local authorities having jurisdiction;
- d. Prior to starting work, all Workers personnel shall participate in a safety, health and environmental protection orientation with a designated Employer representative; and
- e. Prior to starting any work, Employer shall perform a Job Hazard Analysis (JHA). The JHA shall:
  - i. carefully study and record each step of a job;
  - ii. identify existing and/or potential equipment, environmental, or action-generated job hazards; and

- iii. determine the best way to perform the job to reduce or eliminate hazards. During a daily pre-task tool box meeting, Employer shall ensure that the JHA is communicated to and fully understood by all persons who will participate in the performance of the work. Employer shall ensure that the JHA has been communicated to and fully understood by all workers as indicated by the signatures of the workers concerned in an attendance sheet of that meeting.

### **C. Emergency Preparedness and Disaster Management**

Emergency preparedness and an effective execution of response actions help protect workers, contractors, the public and the environment in the event of an accident.

- a. Develop site specific emergency and disaster response plans to ensure the safety of our workers, contractors, operations and affected communities and prevent loss of life, serious injury, or significant environmental or public health impacts;
- b. Provide the necessary human, equipment, and material resources to execute the emergency response plans;
- c. Communicate emergency preparedness and disaster management plans to Workers, contractors, communities, regulatory agencies, and other stakeholders. Coordinate these plans with outside authorities and establish clear roles, responsibilities, and resources;
- d. Plan and conduct periodic emergency and evacuation drills to ensure a constant state of operational readiness to respond to actual incidents;
- e. Review and revise, where necessary emergency preparedness and disaster management plans after a critique of drills or actual emergencies. Apply corrective and improvement actions and monitor to ensure completion. Share best practices and lessons learned with others;
- f. Align and integrate emergency preparedness and disaster management plans with business; and
- g. Implement, as and when required, site specific emergency preparedness and disaster management plans with a sense of urgency to ensure the safety and health of people, operations and affected communities and prevent loss of life and property, serious injury, or significant environmental or public health impacts.

### **D. Safety and Health Communication Program**

Establish a culture that encourages and promotes open communication and informed decision making shall be maintained. Health and Safety information will be shared in a timely manner with management, workers, business partners, the public and key stakeholders through the various channels available.



To strengthen and reinforce an effective health and safety culture. The Health and Safety Communication Program may include, but is not limited to:

- a. Monthly safety meetings;
- b. Use of Health and Safety Bulletin Boards;
- c. Safety posters, announcements and other materials used to support the on-going safety programs and activities;
- d. Use of Company intranet and Health and Safety webpage;
- e. Health and Safety Performance Awards for Individuals, Groups, and Contractors;
- f. Lessons Learned Bulletins and First Alerts;
- g. Contests (slogans, posters, suggestions, etc.); and
- h. Surveys and Questionnaires.

#### **E. Incident Reporting and Investigation**

Develop, implement and maintain standard processes for reporting and investigation of hazards, injuries, illnesses, incidents and any other systems failures that may affect the health and safety of staff, contractors and the community and which may adversely impact on the environment. Procedures shall enable the Employers to:

- a. Report to the Bureau and DOLE Regional Office having jurisdiction over the workplace, in writing of all accidents, fatality, the result of the investigation of all Lost Time Accidents with or without major loss / damages in accordance with Rule 4 Section 14 Notification and Reporting of the RESHERR;
- b. Utilize the fastest available means of communication and shall be made within twenty-four (24) hours after occurrence of any, but not limited to, the following incidents:
  - i. Fatal accidents;
  - ii. Hospitalization of three (3) or more persons;
  - iii. Accidental detonation of explosives including blasting agents;
  - iv. Explosion or blowout;
  - v. Accidental or over-exposure to ionizing radiation;
  - vi. Accidental exposure to immediately dangerous to life and health levels of toxic substances; and
  - vii. Property damages amounting to One Million Pesos (Php1,000,000.00)
- c. Investigate incidents (including near misses) by trained and competent personnel to identify and analyze root causes and system failures; and
- d. Identify and implement corrective actions and continual improvement opportunities in order to prevent future incidents, based on generated incident data and incident investigations.

## **F. Workplace Monitoring And Control**

### **1. Hydrogen Sulfide (H<sub>2</sub>S) Safety**

- a. Employer shall have an H<sub>2</sub>S monitoring and control program in place;
- b. Due to the high degree of Hazard, only trained personnel and workers are allowed to work in work areas where there is a possibility of H<sub>2</sub>S Exposure;
- c. Employer shall evaluate each job for H<sub>2</sub>S hazard;
- d. Regular monitoring of H<sub>2</sub>S shall be conducted by an Authorized Personnel during work activity in areas where its presence is anticipated or expected;
- e. Signs indicating the location of H<sub>2</sub>S detection equipment and supplied air-breathing equipment shall be provided;
- f. Workers shall immediately report areas with H<sub>2</sub>S concentration to the Supervisor-in-Charge for proper action;
- g. Areas with potential H<sub>2</sub>S hazard shall have warning signs;
- h. The use of "Buddy System" is a MUST when working in an area suspected to have a high H<sub>2</sub>S concentration;
- i. Wind direction shall be monitored prior to and during work where H<sub>2</sub>S may be present. Flags or windsocks shall be installed at strategic locations to help indicate wind direction;
- j. Employer shall have in place an H<sub>2</sub>S information and education campaign program to increase awareness of Workers of its hazards;
- k. Emergency procedures shall be implemented in case of accidental discharge of elevated H<sub>2</sub>S level. Only Authorized Personnel shall conduct rescue and/or recovery operation in an H<sub>2</sub>S emergency situation; and
- l. When warranted, protective equipment such as self-contained breathing apparatus (SCBA) shall be used by Authorized Personnel when responding to H<sub>2</sub>S release.

### **2. Permissible Noise Exposure**

- a. Workers shall have a hearing conservation program in place for the exposed Workers; and

- b. Employer must comply with noise exposure levels as mandated by OSHS.

### **3. Illumination**

- a. As applicable, skylights and windows shall be located and spaced so that daylight conditions are fairly uniform over the working area;
- b. All occupied offices and buildings, including perimeters, shall be properly illuminated during normal operation based on OSHS;
- c. Adequate automatic emergency lighting system shall be provided in all stairways, exits, workplaces and passages, as required by the Philippine Building Code and the Fire Code of the Philippines and OSHS; and
- d. Adequate ground lighting shall be provided within the working premises as required under OSHS.

### **4. General Ventilation**

Suitable atmospheric conditions shall be maintained in all work areas by natural and/or artificial means. Measures shall be taken to minimize, if not eliminate, process-related airborne hazards such as dusts, gases, vapor, or mists at the source.

### **5. Extreme Temperature**

- a. All Employees Workers exposed to extreme temperatures shall wear suitable;
- b. All equipment and facility shall undergo re-evaluation for possible redesign or engineering control to minimize temperature hazard; and
- c. Risk and area assessment shall be done where there is possible exposure to extreme temperature.

### **6. Radiation**

- a. All potential sources of electro-magnetic radiation, such as switchyards, high voltage power lines and transformers, shall be identified, and isolated (fenced). Only Authorized Personnel have access to this area;
- b. Authorized Personnel operating radiographic equipment and conducting radiographic inspections must ensure work is in accordance with applicable regulations;
- c. All works and materials emitting radiation, such as but not limited to radiographic testing and naturally occurring radioactive materials from drilling, shall be covered by appropriate permit and signage;

- d. Radiographic testing area must be designated and identified as a Restricted/High Hazard area and roping off or barricading the area is required. Warning signs must be placed in conspicuous locations around the work area to ensure all Workers on site are made aware that hazardous work activity is taking place and must remain in place until all the radiographic activities have been completed;
- e. Personal dosimeters such as thermoluminescent dosimeters and direct reading dosimeters shall be worn by radiographers at all times when they are performing site radiography work;
- f. Work shall be conducted to the degree possible, when only a minimum number of Workers are in the vicinity such as after normal work hours; and
- g. Vessels or pipes being tested must be adequately drained of all liquids prior to the tests being conducted.

#### **G. Lock-Out, Tag-Out and Try Out (LOTOTO) Procedures**

- 1. All LOTOTO shall be covered by work permit system;
- 2. Only Authorized Personnel shall be allowed to conduct LOTOTO;
- 3. Required PPE shall be used in accordance with Section III.A.2 hereof;
- 4. All affected Workers must be notified in a timely manner that a LOTOTO system is going to be utilized and the reason thereof. The Authorized Personnel shall know the type and magnitude of energy that the machine or equipment utilizes and shall understand the hazards;
- 5. If the machine or equipment is operating, it shall be shut down by following the normal stopping procedure (i.e., depress stop button, open toggle switch, etc.);
- 6. Lock-out and tag-out shall be applied on the energy isolating devices with assigned individual lock(s) and tag(s);
- 7. The proper blocking, braking and securing devices of all equipment shall be activated and installed. All stored or residual electrical, gravitational, mechanical and/or thermal energy must be disconnected and drained to a zero-energy state by bleeding, venting, grounding, or other approved means or otherwise made safe by the blocking or repositioning of equipment;
- 8. After ensuring that no Workers are exposed and as a check if the energy source has been fully disconnected, the push button or other normal operating controls shall be tested to ensure that the equipment will not operate;
- 9. All affected Workers shall be notified that the machine or equipment has effectively been isolated and that lock-out and tag-out devices are in place;

10. After completing the servicing or maintenance and the equipment is ready for normal production operations, the area around the machines or equipment shall be checked to ensure that no Worker is exposed;
11. After all tools have been removed from the machine or equipment and guards have been reinstalled, all lock-out and tag-out devices shall be removed;
12. The energy isolating devices shall be operated to restore energy to the machine or equipment;
13. All affected Workers shall be notified that the machine or equipment has effectively been energized and is ready for use; and
14. Lock-out and tag-out devices shall not be used for other purposes and shall be used only for controlling energy.

#### **H. Electrical Works Requirements**

1. All electrical works shall be covered by work permit system;
2. All electrical systems, works and materials shall conform to the latest Philippine Electrical Code;
3. Only Electrical Practitioner authorized by the Employer shall supervise all electrical works in consonance with RA No. 7920 also known as the "*New Electrical Engineering Law of 1995.*"
4. Only duly qualified, competent and authorized Electrical Practitioner shall be allowed to carry out inspection, testing and repair of electrical installations and equipment;
5. A Buddy System must be practiced for all electrical works (120V and above);
6. Prior to any electrical task, Workers working with electricity must remove all metal jewelry;
7. Required PPE shall be used in accordance with Section III.A.2 hereof;
8. Required clearance shall be observed when working near high-voltage lines or equipment in accordance with the latest Philippine Electrical Code. Appropriate protection and/or insulation of high-voltage lines (i.e., powerline cover or protective conductor cover) and barricades shall be provided and installed;
9. Materials, tools and equipment shall be inspected before and after for any wear and damages that may expose the Workers to electrical hazards;
10. Electrical tools and equipment shall be properly guarded and grounded;
11. Electrical tools and equipment shall have Inspection and Maintenance Program;

12. Proper warning and instructional signs shall be visibly posted at all times when work is being performed, and shall be removed or recovered promptly after work is completed;
13. No circuits are to be energized without first informing and receiving clearance from a supervisor/site manager, manager or appropriate site personnel;
14. Appropriate lock-out, tag-out and try-out procedures shall be implemented and observed in accordance with Section III.G;
15. Areas and cabinets with electric power shall be properly marked with signs;
16. First aid shall be available during all electrical works; Emergency response team, depending on criticality of the activity shall be available during electrical works;
17. Hazardous electrical wastes shall be properly managed; and
18. Electrical safety education and training shall be provided to ensure that Workers are knowledgeable in performing their tasks safely.

#### **I. Demolition Requirements**

1. Before any demolition work is started, Authorized Personnel experienced in demolition operations must be appointed in writing as the person responsible for all work on site. The duties of Authorized Personnel shall include the direct supervision of the work force, ensuring that work permit requirements are met, and liaison with other contractors working in the general area and with operators and construction or maintenance engineers;
2. The original drawings of the structure to be demolished shall be obtained. These should be examined to ascertain whether any major changes from the original construction have been made and where utility connections may be found;
3. The method of demolition to be used shall be decided upon in consultation with all Workers involved. The re-use of salvage materials shall be considered prior to this decision;
4. All utility services such as steam, electricity, instrumentation, gas, and water must be shut off and the main supplies disconnected outside the line of the demolition work. Tanks, vessels, and pipelines must be completely disconnected from inlet, outlet, and overflow points;
5. Adjacent structures, buildings, pedestrian walkways, parking lots, etc. shall be protected from demolition debris that can likely cause hazards to the general public. Also, bracing must be installed to ensure stability of adjacent structures;
6. Barricades must be erected around the work area. Visible signs bearing the words "Danger - Demolition in Progress" must be in place;

7. Traffic management plans shall be in place when work is being done as necessary;
8. Before demolition of structures and facilities with asbestos and insulation or removal of equipment containing Polychlorinated Biphenyl (PCBs) or any other hazardous material, the Worker shall notify the Supervisor to ensure safe procedures are followed. Proper PPE and hazardous materials disposal procedures must be utilized;
9. A safe means of access to and egress from all demolition areas and working places must be provided. Work places and the areas around ladders and stairways must be kept clear of material and debris;
10. Nails in timber must be removed or bent over, or the timber must be stacked where it will not be a source of danger. All glass in windows, doors, partitions, etc. shall be completely removed prior to structural demolition;
11. All steel construction shall be demolished column length by column length and tier by tier. A structural member being removed must not be under any stress other than its own weight. Members being cut or dismantled shall be chained or lashed in place to prevent uncontrolled swinging or dropping;
12. No tank, vessel, or pipe work which has contained explosive or flammable material shall be subjected to welding or hot cutting operation until all steps have been taken to remove the substance and any vapors;
13. Mechanical equipment such as cranes and bulldozers should be equipped with wire mesh guards over windows and with solid protection over the driving position so that there is no danger of the operator being struck by flying debris; and
14. As work progresses, continuing inspections must be made to detect hazards arising through weakened or overloaded floors, unsupported walls, or loose material. Immediate steps shall be taken by bracing or by other means to prevent the premature collapse of the whole or any part of the structure.

#### **J. Working in Confined Spaces Procedures**

1. Standard work processes shall be developed, implemented and maintained to ensure that work involving the entry of Workers into confined spaces has been assessed and approved of by an Authorized Personnel;
2. The entry into the confined space shall be administratively controlled using a work permit system;

3. The confined space must be properly isolated and all hazardous energy sources are controlled;
4. The atmosphere inside the confined space must be gas-tested by an Authorized Personnel using properly calibrated equipment in this order:
  - a. Check for Oxygen Content – Oxygen level should be at least 19.5% and not more than 23.5%;
  - b. Check for Combustibles – Flammable atmosphere should be less than 10% of the Lower Explosives Limit (LEL) – (0% is preferred);
  - c. Check for Toxic Gases:
    - i. Hydrogen Sulfide (H<sub>2</sub>S) – should be less than 10 ppm;
    - ii. Carbon Monoxide (CO) – should be less than 25 ppm; and
    - iii. Any other hazardous gases present.

If any of the above is present over normal levels, the area shall not be entered until ventilation by blower is effected;

5. The atmosphere inside the confined space must be monitored and controlled within the limits set for occupational exposure;
6. Approved types of breathing apparatus and other PPE shall be provided and made available for use by the Worker/s entering a confined space;
7. No Worker/s shall enter a confined space unless a watcher is available. The watcher must be familiar with the job and shall maintain contact with the Worker/s in the confined space and be equally provided with breathing apparatus for ready use in case of emergency;
8. Each entry point shall have one dedicated Attendant to control access to the space. Access shall be restricted only to Authorized Entrant;
9. At least one Worker who shall enter the confined space shall wear a properly calibrated and functioning personal multi-gas monitor;
10. Where necessary, Emergency Response Team must be in place;
11. All Workers involved must have attended an appropriate confined space entry training course;
12. No smoking or open lights, torches, arcs or flames shall be permitted in confined spaces until an inspection has been conducted to ensure that fire or explosion possibilities have been eliminated;
13. No spraying or painting using volatile solvents or oil shall be undertaken in confined spaces unless the necessary respiratory and other adequate protections are provided;



14. Any manhole, tank opening, or other opening which is left unattended shall be protected by barricades, provided with appropriate warning signs and sufficient lighting.
15. Adequate means of ingress and egress from any confined or enclosed space shall be provided;
16. Activities involving welding or cutting in confined spaces shall conform with OSHS; and
17. Other applicable procedures in accordance with Safety in Confined Space Manual of DOLE shall be adopted.

#### **K. Work Permit System Procedures**

1. Established safe work permit procedures shall be implemented in the following works:
  - a. Electrical and Mechanical LOTOTO;
  - b. Confined Space Entry;
  - c. Hot Work;
  - d. Excavation;
  - e. Hazardous Materials Handling;
  - f. Work at Heights;
  - g. Critical Lifts;
  - h. Radiation;
  - i. Bypassing Critical Protections;
  - j. Simultaneous Operations; and
  - k. Any other activity deemed critical.
  - l. Simultaneous Operation; and
  - m. Any activity that may adversely affect the safety and health of People and the environment and has a significant potential for injury or environmental incident.
2. The above permit shall include the minimum applicable requirements:
  - a. Permit Number;
  - b. Authorized permit Holder and Issuer/Approver;
  - c. Date of Issue;
  - d. Work Description (Area/ Activity Covered);
  - e. Period of Validity of Permit (Date and Time);
  - f. Work Precaution Checklist;
  - g. Protective Measure Checklist;
  - h. Work Party Acceptance;
  - i. Emergency Response/Equipment;
  - j. Environment Monitoring;
  - k. Job Hazard Analysis and Control;
  - l. Work Carry Over (Turnover of Unfinished Work); and
  - m. Sign Off (Closing).

3. Control for issuance and recording of all permits shall be established;
4. Permits shall be properly posted in the work area;
5. Work covered by permit shall be immediately stopped if permit conditions are not complied with/violated or an incident/accident occurs;
6. Control for the recording and monitoring of all permits that were stopped and revalidation and resolution of action items to address the compliance issues or violations shall be established;
7. An assessment shall be conducted to determine the need for work permit system on other facilities and equipment on site;
8. Workers affected by the work permit system procedures shall be trained on application procedures. Permitting authorities shall likewise be identified and properly trained; and
9. A periodic safety audit shall be in place to determine its adequacy on compliance and effectiveness.

**L. Hazardous Materials Handling And Storage**

1. Toxic chemicals and hazardous waste/substances shall be properly managed, handled, stored, transported and disposed) in accordance with RA No. 6969 also known as the *"Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990"*;
2. All related SDS shall be readily available and communicated to Workers for information and reference;
3. A register on site should be provided detailing the movement, storage, use and disposal of all hazardous materials and dangerous goods, including hazardous wastes and other by-products;
4. The following details must be made known:
  - a. Material description including:
    - i. Product Name;
    - ii. Source or Manufacturer;
    - iii. Use or Purpose; and
    - iv. Quantity stored, used and disposed.
  - b. All potential hazards to health or risks to the environment, resulting from the work being undertaken;
  - c. A copy of risk assessment relating to its specific use;

- d. Work procedures and methods of safe handling required for safe storage, use and disposal so that any human exposure, emissions to atmosphere, or discharge to land or water are avoided or minimized;
  - e. Required permits of use, storage and disposal by local and national regulations;
  - f. Information and training requirements on the hazardous substances;
  - g. Method of removal of any unused materials or by-products from the site upon completion of work;
  - h. Method of disposal that meets safety, health, and environmental regulations; and
  - i. Emergency response measures required if an incident involving such materials happened onsite or offsite.
- 5. All Workers that maybe exposed to chemicals shall be trained on the recommended hazard controls of various chemicals used in the workplace;
  - 6. Chemicals shall be stored according to storage requirements as stated in the SDS with consideration of storage compatibility with other chemicals;
  - 7. The appropriate PPE should be worn as prescribed in the work permit system, as stated in the instruction/procedure or as advised by the supervisor; and
  - 8. All exposed Workers shall be given immediately proper medical attention for any untoward effects from handling toxic chemicals and hazardous wastes/substances.

#### **M. Compressed Gas Handling and Storage**

- 1. Gas cylinders shall be chained/ supported in an upright position at all times and should be placed in a secured and well-ventilated area;
- 2. Cylinder cap shall be properly installed when the cylinder is not in use and when being moved/transported;
- 3. Gas cylinders shall be labeled, appropriately stored and secured in designated areas and shall conform to the requirements of all applicable industry and regulatory standards;
- 4. All hoses, gas regulators and other accessories shall be regularly inspected and maintained;
- 5. Appropriate shut-off tool/spanner shall be readily available for use;
- 6. Flashback arresters shall always be available and properly installed;
- 7. Compressed gas cylinders are prohibited inside confined spaces; and

8. Appropriate handling equipment (cart or wheeler) should be used when transferring cylinders.

#### **N. Flammable Liquids Handling, Storage, Labeling and Disposal**

1. Flammable liquids shall be properly stored, labeled, handled and disposed of according to recommended controls, as specified in the SDS, in accordance with applicable OSHS and/or DENR Standards;
2. Approved safety pumps and similar devices shall be used when transferring liquids from one container to another. Motorized pumps shall be properly grounded;
3. Appropriate safety containers shall be used in handling or transporting flammable liquids;
4. Adequate fire control and fire-fighting equipment shall always be available in areas where flammable liquids are present;
5. Flammable liquids shall not be discharged into the sewers, drainage, canals or natural waterways;
6. Empty flammable containers shall be disposed of in accordance with the manufacturer's instructions and local regulatory requirements; and
7. Hauling of flammable and/or combustible liquids must be in compliance with DENR standards.

#### **O. Warehouse Safety**

1. Warehouses shall be well-ventilated and well-lighted. The lighting specification and requirement shall be in accordance to the latest Philippine Electrical Code, the DOE Manual of Practice on Efficient Lighting and/or the Institute of Integrated Electrical Engineers of the Philippines, Inc.'s (IIEE) Manual for LEED Compliant Lighting System Design;
2. If a warehouse is provided with fire sprinkler system, it must conform with the National Building Code;
3. Storage areas shall be provided with adequate fire extinguisher located at strategic places in accordance with the Fire Code of the Philippines;
4. Adequate clearance between stocks and wall, and between aisles, shall be provided for easy access;
5. Warehouse shall be provided with enough space for the operation of material handling equipment;
6. Materials stored in open areas shall be protected against the weather, and shall not be placed in direct contact with bare soil or ground;

7. Eyewash stations must be available in designated areas and shall be regularly maintained; and
8. Shelves shall be labeled to indicate the capacity they can carry.

**P. Ladder Safety**

1. Inspect ladders prior and after use to ensure their good state of repair. Take out of service immediately damaged or defective ladders, report them to management, and tag on them a warning sign so they will not be used until it can be properly repaired or replaced;
2. Maintain ladders free of oil, grease and other slipping hazards;
3. Do not load ladders beyond their maximum intended load nor beyond their manufacturer's rated capacity;
4. Use ladders only for their designed purpose;
5. Use ladders only on stable and level surfaces unless secured to prevent accidental movement;
6. Do not use ladders on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental movement;
7. Secure ladders placed in areas such as passageways, doorways or driveways, or where they can be displaced by workplace activities or traffic to prevent accidental movement. Or use a barricade to keep traffic or activity away from the ladder;
8. Use ladders equipped with nonconductive side rails if the worker or the ladder could contact exposed energized electrical equipment;
9. Always maintain a 3-point (two hands and a foot, or two feet and a hand) contact on the ladder when climbing. Keep your body near the middle of the step and always face the ladder while climbing
10. Do not carry objects or loads that could cause loss of balance and falling;
11. Parallel, level and uniformly space ladder rungs, cleats and steps when the ladder is in position for use;
12. Do not tie or fasten ladders together to create longer sections unless they are specifically designed for such use;
13. If the total length of the climb on a fixed ladder equals or exceeds 24 feet (7.32 m), equip with the ladder safety devices or self-retracting lifelines and rest platforms;
14. Immediately mark defective or tag with "DO NOT USE" or similar language and withdraw from service until repaired ladders with structural defects—such

as broken or missing rungs, cleats or steps, broken or split rails, corroded components or other faulty or defective components;

15. Never move, "walk" or "jog" a ladder while on it. Climb down first and reposition the ladder;
16. Do not climb while holding something-use tool belt to carry tools. If need to move equipment to the roof that cannot be fastened or carried safely in a tool belt, tie off properly, using fall protection, and use a rope or hoist to raise and lower tools and other objects;
17. Allow one person on a ladder at one time;
18. Always move the ladder to avoid overreaching;
19. Never leave raised ladders unattended;
20. Always work within an arm's reach from the ladder, keep both feet on the rungs and use belt buckle as a guide to keep weight centered on the ladder during all times;
21. Be sure that the shoes are free of mud, grease or other substances which could cause a slip or fall; and
22. Free the areas around the top and base of ladders from tripping hazards such as loose materials, trash and electric cords.

**Q. Lightning Protection**

1. Lightning protection system shall be installed in wind project structures and lifting equipment, especially on facilities with sensitive electronic equipment;
2. Installation of lightning protection shall be done by trained and qualified lightning protection specialists;
3. For quality assurance, all materials and methods shall comply with nationally recognized safety standards for lightning protection as established by National Fire Protection Association/latest Philippine Electrical Code;
4. Other electrical works shall be in place as prescribed in Section III.H hereof; and
5. Required PPE shall be used in accordance with Section III A.2 hereof.

**R. Facility Improvement Works**

**1. Excavation and Filling Works**

- a. All excavation and filling works shall be covered with appropriate work permit system;



- b. Only Authorized Personnel shall supervise all excavation and filling works;
- c. Roles must be clearly defined, and Workers must meet the training requirements for excavation and filling works;
  - i. A Civil Engineer or Qualified Professional shall be employed for the analysis of soil types and conditions;
  - ii. Excavation in close proximity to building, roads, retaining walls and other structures or deeper than 20 feet (6.1 meters) must be reviewed and approved by a Civil Engineer or Qualified Professional; and
  - iii. Protective systems (i.e., shoring, bracing, sloping, benching, and shields) for excavations 4.9 feet (1.5 meters) deep shall be designed by a Civil Engineer.
- d. Before any excavation is started, available drawings/plans, electronic and/or other appropriate equipment to locate underground pipelines, electrical lines, and other utilities are utilized. When all lines have been located, the excavation work area will be rechecked to ensure that no lines have been missed. When lines have been located they shall be exposed by hand before using mechanical excavators;
- e. Required PPE shall be used while doing excavation and filling works;
- f. Proper warning and instructional signs shall be visibly posted at all times when work is being performed, and shall be removed or recovered promptly after work is completed
- g. Excavation areas shall be properly barricaded, delineated and provided with proper safety and warning signs;
- h. Excavation material and heavy equipment shall be kept at a distance as prescribed under OSHS;
- i. Gangplanks with railing or metal plates shall be provided where an excavation crosses driveways or streets;
- j. Approved access ladder shall be provided and regularly inspected. Ladders shall be extended 3 feet (0.9 meter) above the level to be accessed;
- k. Sloping, sheeting, shielding, benching, shoring, cutbacks, fencing, bracing or approved temporary protective structures that may be required for safe operations, are provided for and used, built in accordance with standard engineering practices;
- l. Excavation works on identified H<sub>2</sub>S prone area shall be inspected for presence of H<sub>2</sub>S before any work will commence and regularly monitored during the duration of the work;

- m. Temporary railings, barricades, fencing, lanterns, reflective flagging or illuminated warning devices and other warning systems are placed around excavations left open at night or where there is a hazard to Workers and the general public;
- n. Spoils, materials or equipment that might fall or roll into an excavation or trench are kept at least 3.3 feet (1 meter) from the edge of excavation, or not less than one-third (1/3) of the depth for excavation deeper than 9.9 feet (3 meters);
- o. A Confined Space Entry Permit is prepared and approved to control the work when entry into excavations and trenches deeper than 3.9 feet (1.2 meters) is to be performed;
- p. Workers must be protected from accumulation of water, gas and other elements that may be encountered during excavation. Risks associated with hazardous atmosphere inside excavations shall be analyzed and mitigated; and
- q. Rescue plans must be developed for excavations. First aid shall be available at all times; Emergency response team shall be available depending on the results of the risk assessment.

## **2. Concreting and Structural Works**

- a. Work permits shall cover all structural works at heights and all works that require the use of oxy-acetylene cutting and any kind of welding works;
- b. Roles must be clearly defined, and personnel must meet the training requirements for concreting and structural works;
- c. Only Authorized Person shall supervise all concreting and structural works;
- d. Required PPE shall be used while doing concreting and structural works in accordance with Section III.A.2 hereof;
- e. Proper warning and instructional signs shall be visibly posted at all times when work is being performed, and shall be removed or recovered promptly after work is completed;
- f. Work sites shall be properly barricaded, delineated and provided with proper safety and warning signs;
- g. Standard scaffoldings and full body harness shall be provided when working at heights. Installation and dismantling of scaffoldings shall be performed in accordance with DOLE DO No. 128-13;
- h. Lifting procedure shall be implemented for heavy and special lifting works. Lifting and rigging procedures shall be in accordance with OSHS; and



- i. Rescue plans must be developed for works at height and lifting operations. First aid shall be available during at all times; Emergency response team shall be available depending on the results of the risk assessment.

### **3. Road Works / Earth Moving**

- a. Only Authorized Personnel shall supervise all road works;
- b. Roles must be clearly defined, and Workers must meet the training requirements for road works and earth moving;
- c. Required PPE shall be used while doing road works in accordance with Section III.A.2 hereof;
- d. Proper warning and instructional signs shall be visibly posted at all times when work is being performed, and shall be removed or recovered promptly after work is completed;
- e. Traffic management plans shall be in place when work is being done;
- f. Workplace conditions shall be inspected to eliminate or control hazards that may expose the Worker to injury;
- g. Work sites shall be properly barricaded, delineated and provided with proper safety and warning signs;
- h. Only Authorized Personnel shall be allowed to operate equipment;
- i. Heavy equipment shall have spotter to assist the operator; and
- j. First aid shall be available at all times; Emergency response team shall be available depending on the results of the risk assessment.

### **4. Piping and Insulation Works**

- a. Only Authorized Personnel shall supervise all piping and insulation works;
- b. Only Authorized Personnel shall be allowed to conduct piping and insulation works;
- c. Required PPE shall be used while doing piping and insulation works in accordance with Section III.A.2 hereof;
- d. Proper warning and instructional signs shall be visibly posted at all times when work is being performed, and shall be removed or recovered promptly after work is completed;
- e. Workplace conditions shall be inspected to eliminate or control hazards that may expose the Worker to injury;

- f. Work sites shall be properly barricaded, delineated and provided with proper safety and warning signs;
- g. All coded piping and insulation works (i.e., high pressure pipe welding, hot tapping) shall have detailed and approved safe work procedures;
- h. All piping and insulation works shall be covered with appropriate work permit system;
- i. All coded piping and insulation work wastes shall be properly disposed according to environmental regulations; and
- j. First aid shall be available at all times; Emergency response team shall be available depending on the results of the risk assessment.

## **5. Hot Works**

- a. The Employer shall establish a program which designates who issues a hot works permit and what kind of jobs are covered by a hot works permit.
- b. Only Authorized Personnel shall be allowed to conduct hot work;
- c. Required PPE shall be used while doing hot works in accordance with Section III.A.2 hereof;
- d. Proper warning and instructional signs shall be visibly posted at all times when work is being performed, and shall be removed or recovered promptly after work is completed;
- e. Workplace conditions shall be inspected to eliminate or control hazards that may expose the worker to injury and potential property damage;
- f. All hot works shall have detailed and approved safe work procedures;
- g. All hot works shall be covered with appropriate work permit system;
- h. Combustible and flammable materials shall be removed from the work area;
- i. Items that cannot be removed shall be covered with fire-retardant blankets;
- j. In areas where hot works are performed, the floor shall always be kept clean;
- k. Welding shields shall be provided to contain or protect from sparks and splatters;

- l. A Fire Watch with appropriate communication and fire extinguishing equipment shall be assigned whenever hot work is performed in locations where other than a minor fire might develop;
- m. The hot work area shall be gas tested by an Authorized Personnel if the area is known to have potential presence of flammable gas or liquid using approved and calibrated gas detection instruments. Atmospheric conditions in the work area must be acceptable before any work is allowed to start or continue. Flammable atmosphere shall be less than 10% of the LEL; and
- n. First aid shall be available at all times; Emergency response team shall be available depending on the results of the risk assessment.

## **6. Mechanical and Equipment Installation**

- a. Mechanical Engineers shall supervise over all mechanical equipment installation as per Article IV, Section 33 and 35 of RA No. 8495;
- b. Observe the personnel requirement under Section 34 of RA No. 8495;
- c. Mechanical equipment covered by DOLE technical safety inspection shall secure the needed permit to install before installation and permit to operate before operation;
- d. Roles must be clearly defined, and Worker must meet the training requirements for mechanical and equipment installation;
- e. Required PPE shall be used while doing mechanical and equipment installation in accordance with Section III.A.2 hereof;
- f. Proper warning and instructional signs shall be visibly posted at all times when work is being performed, and shall be removed or recovered promptly after work is completed;
- g. Workplace conditions shall be inspected to eliminate or control hazards that may expose the Worker to injury;
- h. All mechanical and equipment installation shall have detailed and approved safe work procedures;
- i. All mechanical and equipment installation shall be covered with appropriate work permit system;
- j. All mechanical and equipment installation work wastes shall be properly disposed according to environmental regulations;
- k. Appropriate lifting equipment and procedures shall be used in mechanical installation; and

- I. First aid shall be available at all times. Emergency response team shall be available depending on the results of the risk assessment.

## **S. Motor Vehicle and Heavy Equipment Operations**

1. Only Authorized Personnel shall supervise all motor vehicles and heavy equipment operations;
2. Only Authorized Personnel shall be allowed to operate motor vehicles and heavy equipment;
3. Drivers and heavy equipment operators shall have valid driving license and mandatory government certifications appropriate for the equipment they will operate;
4. Drivers/operators under the influence of liquor and/or asleep inducing drugs or any medication that will affect vision, judgment and reflexes shall not be allowed to operate motor vehicles and heavy equipment;
5. All motor vehicles and heavy equipment shall be:
  - a. Provided with basic emergency tools and equipment like early warning device, choke block, fire extinguisher etc.;
  - b. Subjected to a pre-use inspection;
  - c. Loaded up to its rated capacity only; and
  - d. Subjected to scheduled preventive maintenance.
6. All drivers/operators shall immediately report any observed unsafe condition of the motor vehicles and heavy equipment;
7. All drivers/operators shall strictly follow all established company and government traffic rules and regulations;
8. All vehicles and heavy equipment deemed or reported to be unsafe shall be removed immediately from service and shall not be used until appropriate repair has been undertaken;
9. All drivers shall report immediately any vehicular incident to the company and appropriate authorities;
10. All motor vehicles and heavy equipment shall be equipped with the prescribed and approved seat belts for all driver and passenger seats;
11. Only Authorized Personnel shall conduct repairs to all motor vehicles and heavy equipment;



12. Any vehicle with restricted vision shall not be moved while in the vicinity of other workers, processing equipment or servicing/drilling equipment except under the direction of a designated signal man or spotter; and
13. A Journey Management Plan shall always be prepared for non-routine trips and journeys with high risks (i.e., oversized cargoes, unpaved roads, roads with dangerous curves) to ensure that driving risks and exposures are minimized and managed.

#### **T. Hoist and Lifting Works Operations**

1. Only Authorized Personnel shall supervise hoist and lifting works;
2. Only Authorized Personnel shall be allowed to operate hoist and lifting equipment;
3. Only authorized rigger shall be allowed to direct and guide hoist and lifting operation;
4. Operators under the influence of liquor and/or asleep inducing drugs or any medication that will affect vision, judgment and reflexes shall not be allowed to operate hoist and lifting equipment;
5. All hoist and lifting equipment shall conform to the requirements of all applicable industry and regulatory standards;
6. All hoist and lifting equipment shall be provided with basic emergency tools and equipment where applicable like horn, lights, outrigger matting, fire extinguisher etc.;
7. All hoist and lifting equipment shall be subjected to a pre-use inspection by authorized operator for safe operation;
8. All hoist and lifting equipment shall be loaded up to its rated capacity only;
9. All hoist and lifting equipment shall be subjected to scheduled preventive maintenance in accordance with manufacturer's recommendations;
10. Worker/s shall immediately report any observed unsafe condition of the hoist and lifting equipment;
11. All unsafe hoist and lifting equipment shall be removed immediately from service and shall not be used until appropriate repair has been undertaken;

12. Worker/s shall report immediately any incident/accident to the company and appropriate authorities;
13. All hoist and lifting equipment shall be equipped with the prescribed and approved seat belts;
14. A daily routine inspection of all heavy equipment deployed at the site shall be conducted by Authorized Personnel and certified mechanics shall conduct repairs of the hoist and lifting equipment;
15. All heavy equipment shall be regularly inspected and maintained in good condition;
16. All hoist and lifting equipment shall be subjected to load test inspection as recommended by the manufacturer and as prescribed by DOLE or its recognized organizations;
17. All critical lift works or jobs shall be covered by critical lift procedure;
18. The general constructor or the equipment owner shall maintain a separate logbook for data on maintenance, repairs, tests and inspections for each heavy equipment;
19. Prior to performing a lift, the operator shall determine the weight of the object to be lifted and ensure that cables, lifting devices, slings, wire ropes, chains, etc. are of sufficient strength, in proper condition, and positioned to support the weight of the load. Load calculations shall be conducted for all critical lifts;
20. The following shall always be considered:
  - a. Proximity to power lines;
  - b. Proximity to other Worker and equipment;
  - c. Wind velocity;
  - d. Ground conditions for outriggers;
  - e. Reach or extension of lifting equipment;
  - f. Weight of the load including the rigging being used; and
  - g. Outriggers placed on load bearing floats or pads that are adequate size and strength for loads being lifted;
21. One person shall be designated as a spotter (signal person or flagman) and the lifting device operator shall take direction or instruction from the spotter only;
22. The operating area of the lifting device shall be barricaded and no Worker shall allow any part of his body to extend underneath any load being lifted by a crane, side boom, or other lifting device; and

23. No person shall be allowed to work, walk through, stand, or stay beneath any suspended load being lifted, moved or lowered.

#### **U. Working at Height and Protection from Falling Objects**

1. Ensure all structures are designed and built to the appropriate standards and have the appropriate means of working at height systems fitted;
2. Establish and maintain suitable exclusion zones underneath any working at height activities, where possible, to protect workers from falling objects;
3. Ensure all Workers working at height are trained and competent in the use of all working at height and rescue systems in place;
4. Provide Workers with a suitable work-positioning device; also ensure the connectors on positioning systems are compatible with the tower components to which they are attached;
5. Ensure that hoisting equipment is properly rated and maintained and that hoist operators are properly trained;
6. When working at height, fit all tools and equipment with a lanyard, where possible, and capture netting shall be used if practicable;
7. Remove signs and other obstructions from poles or structures prior to undertaking work;
8. Use an approved tool bag for raising or lowering tools or materials to workers on elevated structures;
9. Avoid conducting tower installation or maintenance work during poor weather conditions and especially where there is a risk of lightning strikes;
10. Place an emergency plan detailing the methods to be used to rescue operatives should they become stranded or incapacitated while at height; and
11. Use required PPE while working at height as protection from falling objects in accordance with Section III.A.2 hereof.

#### **V. Fire Hazards, Protection and Control**

##### **1. General Objective**

All biomass and biofuel operators shall establish a fire prevention and control program in accordance to RA No. 9514 also known as the "*Fire Code of the Philippines of 2008*".

## **2. Fire Extinguishers**

- a. Fire extinguishers shall be inspected once a month and shall be maintained in good operating condition at all times;
- b. Fire extinguishers shall be kept in their designated places. If they are removed for refilling/repair, it shall be replaced immediately with the same type and capacity;
- c. Durable inspection tags shall be attached securely to each extinguisher showing the servicing data properly recorded and signed by the designated safety officer or end-user;
- d. Fire extinguishers shall be installed in strategic locations free from obstructions. Only fire extinguishers shall be placed inside the extinguisher box to avoid exposure to excessive heat;
- e. Tampering of markings, tags and other emergency instructions labeled on all fire protection equipment shall be prohibited;
- f. Fire extinguishers shall have hydro testing records according to manufacturer's specifications; and
- g. Fire extinguishers shall conform to the fire protection standard as per Fire Code of the Philippines and DAO 2000-18 also known as the Chemical Control Order for Ozone Depleting Substances (ODS) and other related rules.

## **3. Fire Hydrants, Fire Hoses and Accessories**

- a. Fire hydrants, hoses and accessories shall conform to the Fire Code of the Philippines;
- b. Fire hydrants, hoses and accessories shall be kept in good condition. They shall be used properly and only for the purpose for which they are intended
- c. Fire hose installed at yard hydrant shall be kept in well-ventilated fire hose cabinet properly locked and marked "FOR FIRE USE ONLY";
- d. Only Authorized Personnel shall conduct inspection and/or testing of fire hydrants, hoses and accessories at least once a month. Defective items shall be replaced immediately;
- e. Firefighting equipment shall be placed in strategic locations and must be free from obstructions; and



- f. Tampering of fire alarms, valves and other accessories is prohibited. Any damaged parts shall be immediately repaired and replaced.

#### **4. Firebreak**

- a. Firebreaks shall be of sufficient length and width to contain a possible fire and allow passage of firefighting vehicle; and
- b. Erosion control measures must be incorporated into firebreaks with sloping ground.

### **W. Scaffolding Safety**

Scaffoldings requirements shall be in accordance with DOLE DO No. 128-13.

#### **1. General Requirements**

- a. Installation, dismantling and structural requirements of scaffolding shall conform to the requirements of all applicable industry and regulatory scaffolding standards;
- b. Every scaffold shall be of good construction of sound materials and strength for the purpose for which it is intended;
- c. Timber used for scaffolds shall be in good condition, the bark completely stripped off, and not painted or treated in any manner that defects cannot be easily seen;
- d. All materials and parts of scaffold not in use or intended for re-use shall be kept under good condition and separate from other materials unsuitable for scaffolds;
- e. Scaffolds shall be erected, moved, dismantled, or altered only under the supervision and direction of a qualified scaffolder.;
- f. Scaffolds and scaffold components shall be capable of supporting, without failure, its own weight and at least 4 times the maximum intended load;
- g. Scaffold products from different manufactures shall not be mixed on a scaffold, unless they are specifically designed to be used together;
- h. A scaffold shall never be erected within 10 feet (3 meters) of power lines;
- i. It is prohibited to ride on a moving mobile scaffold;

- j. Guardrails, midrails, and toeboards shall be installed on all open sides and ends of platforms 6 feet (1.8 meters) above the working surface (floor);
- k. Guardrails shall be 2" X 4" or the equivalent (2" nominal diameter for tubular scaffolds) approximately 42 inches (106.7 cm) in ht. with a midrail. Supports shall be at intervals not to exceed 8 feet (2.4 meters);
- l. Toeboards shall be of 4 inches (10.2 cm) in height;
- m. Scaffold planks shall extend over their end supports not less than 6 inches nor more than 12 inches (30.5 cm);
- n. Any scaffold including accessories such as braces, brackets, trusses, screw legs, ladders, etc. damaged or weakened from any cause shall be immediately repaired or replaced;
- o. Timber planking is allowed for the scaffold and shall have a minimum of 1.500 fiber (stress grade) construction grade lumber;
- p. Scaffolding will be inspected for safe conditions on a daily basis. The contractor responsible will maintain a daily inspection permit and must conform to the requirements on the project site;
- q. Scaffold must be tagged by a competent person. This inspection tag shall be attached on the scaffold at all times. Scaffold identification tags are color coded for each reference and shall be located at the point of access;
- r. All personnel using a rolling scaffold must engage the wheel locking devices or block the scaffold against movement when the scaffold is stationary and personnel are working from the scaffold. Moving scaffolding with personnel on the scaffold is strictly prohibited;
- s. Tools and equipment shall be raised to the work site in a bag or utility belt designed for that purpose. Straight access ladder attached to scaffolding shall not exceed 20 feet (6.1 meters) without a break or offset that would limit a potential fall exposure. Access ladder that exceed 20 feet (6.1 meters) from the ground level shall be placed inside the scaffolds frame with trap door conditions at access levels;
- t. Ladders shall not be used on scaffolds to increase the working level height of workers, except on large area scaffolds where workers have satisfied some reasonable criteria;

- u. Makeshift devices, such as but not limited to boxes and barrels, shall not be used on top of scaffold platforms to increase the working level height of Workers;
- v. Scaffold tower, single-section, or rolling scaffolds must not exceed a 4:1 base-to-height ratio without structural bracing. Nor shall any section of the scaffold exceed a 4:1 ratio without structural bracing;
- w. Cantilevered or outrigger scaffolds must have documentation to demonstrate safe loading conditions;
- x. All suspended scaffolds require independent safety lines for each worker. Workers must use a full body harness when working from any suspended scaffold. Personal fall arrest system used on scaffolds shall be attached by a lanyard to a vertical lifeline, horizontal lifeline, or scaffold structural member;
- y. Personal fall arrest system/Safety harnesses meeting an approved standard must be worn. Only full body safety harnesses (i.e., with chest and leg straps) will be permitted; and
- z. Overhead work shall not be carried out above other workers unless the workers below are adequately protected by the installation of an overhead barrier. Every area where a worker could be struck by a falling object shall be clearly marked by barriers, notices, warning lights or other warning devices.

## **2. Scaffolding Components and Requirements**

### **a. Materials**

- i. Materials to be used in erecting scaffolding shall be in good condition;
- ii. Steel items shall be free from rust; and
- iii. Mandatory inspection shall be conducted by experienced and competent person to all materials before use.

### **b. Foundation**

- i. Scaffold shall be capable of supporting without failure at least 4 times the maximum intended load;
- ii. Timber sills at least 23 cm (9.1 in.) wide by 3.8 cm (15 in.) thick will be required to spread the load. A sill shall extend under at least two post;

- iii. Where scaffolding is erected on a solid bearing such as rock or concrete, small timber pads may be used in place of sills and nailed to prevent the base plates sliding off;
- iv. If used to compensate variations in ground levels, the screw jacks shall not be adjusted more than two-thirds of the total length of the thread;
- v. Scaffolds shall be anchored or secured to permanent or rigid structures. In the absence of permanent structures, guys and sway bracing and/or outrigger shall be used; and
- vi. The foot of any standards or upright shall be adequately founded on a suitable base plate in order to prevent slipping or sinking.

c. Posts

- i. Posts shall be pitched on 6 inches (15 cm) by 6 inches (15 cm) steel and at least 0.25 inch (0.64 cm) thick. All post shall be vertical; and
- ii. The inner row posts shall be placed as closed as possible to the face of the building structure. The outer row shall be positioned depending on the load requirements of the scaffold.

d. Runners

- i. Runners shall be securely fixed to post with standard couplers and shall be horizontal; and
- ii. Runners shall be vertically spaced no more than 6.5 feet (2.0 meters) to give adequate headroom along the platform;

e. Bearers

- i. Bearers shall be installed between post and securely fixed to the post with standard couplers; and
- ii. Board bearers shall be installed between bearers to accommodate differences in planks length.

f. Bracing

- i. Longitudinal diagonal bracing shall be installed at approximately 45° angle from near the base of the first outer post upward to the extreme top of the scaffold.

g. Ties

- i. All supported scaffolds except tower and mobile shall be securely tied to a building or structure throughout their length and height to prevent movement of the scaffold;

- ii. Ties shall be spaced every other lift and every 19.6 feet (6 meters) along the face of the scaffold;
- iii. Ties shall be fixed with load bearing couplers, as close to the node point as possible;
- iv. Any structural features of the buildings e.g. pillars, columns, lintels, rebates, etc. shall be taken full advantage of to provide additional strength and stability to the tie;
- v. Make sure that the building is strong enough to support the tie and the load imposed on it by the scaffold; and
- vi. For any reason, tie shall not be removed until the overall stability of the scaffold has been confirmed.

#### h. Platform Units

- i. All platform units shall be closed planked for the full width of the scaffold structure;
- ii. Planks shall extend over their end supports by not less than 6 inches (15 cm) and not more than 12 inches (30.5 cm);
- iii. Planks shall be secured in position to prevent displacement by strong winds;
- iv. Mid rails must be installed halfway between the top rail and platform and can withstand force of 150 lbs.; and
- v. Toe boards shall not be less than 4 inches (10 cm.) in height by 1 inch (2.5 cm) thick.

#### i. Access

- i. Access to a working platform is best achieved by providing a separate ladder tower or a cantilevered access platform so as not to obstruct the working platform and to minimize the risk of persons falling through gaps in the guardrail system or platform units. Access should be provided to working platforms; and
- ii. Working platform shall be provided per level during erection. This working platform shall not be removed unless the succeeding level is installed.

#### j. Workmanship

- i. Scaffolding shall be erected, altered and dismantled by experienced men working under the direction of a competent supervisor; and

- ii. Scaffolds of more than 19.6 feet (6 meters) in height shall be designed by a structural engineer and shall be erected, installed and dismantled by TESDA certified erectors.

k. Inspection

- i. All scaffolds shall be inspected by a competent supervisor, safety officers, and/or civil engineers before it is used and after adjustments, modifications, adverse weather conditions, etc., to measure that is safe:
  - i.i **Green** tags shall be hanged at each scaffolds access that have been inspected and are safe for use;
  - i.ii **Yellow** tags shall be placed whenever special requirements for safe use are required. Situation requiring yellow tags may include whenever scaffold has been modified to meet work requirements, and as a result could present a hazard to the user. Situation requiring Yellow tags shall be closely supervised; and
  - i.iii **Red "DANGER - UNSAFE FOR USE"** tags shall be used during erection and dismantling when the scaffold is left unattended. Red tag shall be used when all green or yellow tags has been removed or during erection of scaffolds.
- ii. All the records of the inspection shall be available on site and made available to proper authority upon request.

3. Training and Competency Requirement

a. Competent Person

- i. All scaffolds competent person must undergo the standard scaffold training and assessment prescribed by DOLE and TESDA.
- ii. The competent person shall have the following certification:
  - ii.i COSH Training Certificate from DOLE or its accredited safety training organizations;
  - ii.ii Must be a holder of TESDA prescribed Scaffold Erection Certificate; and
  - ii.iii At least 2 years' experience in scaffold erection.

b. Scaffold Erector

- i. All scaffolds erectors must undergo the standard scaffold training and assessment prescribed by DOLE and TESDA;
- ii. Scaffold erectors shall have the following certifications:
  - ii.i One Day Workers Safety Organization from DOLE or its accredited safety training organizations; and
  - ii.ii. Must be a holder of TESDA prescribed Scaffold Erection National Certificate.

**X. Machine Shop Safety**

1. Allow only Authorized Personnel to use the machine shop;
2. Use required and appropriate PPE while working in the shop in accordance with Section III.A.2 hereof;
3. Observe the "buddy system" while working in the shop;
4. No eating, drinking and smoking inside the machine shop area;
5. Keep the work area clean and always keep the floor free of grease, oil or any other liquids;
6. Do not allow horseplay and/or running in the machine shop;
7. Do not wear loose jewelry and clothing including long sleeves and ties in the shop;
8. Tie back long hair while working in the shop;
9. Seek for your co-worker's assistance in handling large, long, or heavy pieces of material or machine attachments;
10. Report any unsafe acts and conditions to the shop supervisor and/or safety officer;
11. Always make eyewash and first aid kit station available in a designated place; and
12. Post the machines user's guide and/or safety manuals in a strategic location for easy reference.

## **Y. Tools, Equipment and Machinery Operations**

1. Workers must only work with tools, equipment and machines that they have been authorized to use;
2. Appropriate tools, equipment and machines shall be used on a specific job;
3. Each tools, equipment and machines must be examined before use; damaged tools, equipment and machines should be reported to proper authorities.
4. Damaged tools, equipment and machines must be repaired before using it;
5. All tools, equipment and machines necessary to complete the task must be kept in good condition with regular maintenance;
6. Tools, equipment and machines must be operated according to the manufacturers' instructions;
7. All tools and equipment should be kept cleaned and stored appropriately when not in use;
8. All portable electrically-driven tools, equipment and machines shall be properly grounded before use;
9. Iron or steel hand tools may produce sparks that can be an ignition source around flammable substances. Where this hazard exists, spark-resistant tools made of non-ferrous materials should be used where flammable gases, highly volatile liquids, and other explosive substances are stored or used;
10. Air supply shall be shut off when pneumatic tools, equipment and machines are not in use;
11. Pointed or sharp tools, equipment and machines shall be provided with cover;
12. Talking to others while they are operating a machine is prohibited;
13. Tools should not be left unattended. They should be placed in the designated toolboxes or cabinets after using them;
14. A machine should not be left unattended while it is running;
15. Only one person may work on a machine at a time;
16. When working with another person, only one should operate the machine or switches;
17. A cutter should not be used by pushing it towards your body parts;
18. Work piece must always be secured with a clamp or vise;





19. Compressed air should never be used without a safety nozzle to clean the machines. Compressed air should never be used to clean clothing;
20. Metal chips, turnings or shavings should not be removed with your hands;
21. Tools should be disconnected when not using them, before servicing and cleaning them, and when changing accessories such as blades, bits, and cutters;
22. Proper apparel for the task should be worn. Loose clothing, ties, necklaces, or jewelry can become caught in moving parts;
23. Electrical hand tools shall not be used in a combustible environment until the Supervisor certifies that conditions are safe and a Hot Work Permit has been issued; and
24. The tools, equipment and machines user's guide and/or safety manuals should always be followed.

## **Z. Machine Guarding**

All moving parts of prime movers, transmission equipment and all dangerous parts of driven machinery shall be effectively guarded, unless so constructed or located to prevent any person or object from coming or brought into contact with them;

1. No person shall remove or make ineffective any safeguard, safety appliance, or safety device guarding a dangerous machine or machine part unless such is authorized and the machine is stopped for the purpose of immediately repairing and adjusting such machinery, guard, appliance or device;
2. Warning signs with standard color shall be installed near the machine being repaired or its guards removed;
3. Upon completion of the repairs or adjustment, such guards, appliances or devices shall immediately be reinstalled before the machine is used;
4. Guards shall be designed, constructed and used that they will:
  - a. Provide positive protection;
  - b. Prevent all access to the danger zone during operations;
  - c. Cause no unnecessary or inconvenience operation or production;
  - d. Operates automatically or with minimum effort;
  - e. Be suitable for the job and the machine;
  - f. Cause no obstruction or interfere with machine oiling, inspection, adjustment and repair;
  - g. Withstand long use with minimum maintenance;

- h. Resist normal wear and shock;
  - i. Be durable, fire and erosion resistant;
  - j. Not constitute a hazard by themselves; and
  - k. Give protection against operational contingencies and not merely protect normally expected hazard;
- 5. Standard guards or enclosures shall be made of materials suitable for the purpose for which they are designed and constructed; and
- 6. All machinery guards shall be securely fastened to the machine or to the floor, wall or ceiling and shall be kept in place whenever the machine is in operation.

## **AA. Biological Safety**

### **1. General Requirements**

- a. All field activities/works shall be covered with appropriate work permit system
- b. Required PPE shall be used while doing field activities such as long pants, long-sleeves shirts, shin guards, heavy high top shoes or hiking boots to cover exposed body parts and provide some protection and use walking sticks; and
- c. Workers training should always include information on safe methods and prevention for highly hazardous procedures that are commonly encountered during outdoor field work.

### **2. Workplace Inherent Biological Hazards**

- a. To avoid bees and wasp stings:
  - i. Avoid known areas of concentration such as hives and nests;
  - ii. If flying insects are around, leave the area and refrain from swatting at them;
  - iii. Avoid sugary foods, drinks, and strong fragrances or perfumes because some insects may be attracted to them;
  - iv. Wear long pants, and long-sleeves shirts;
  - v. Wear heavy high top shoes or boots, protective gloves, and use walking sticks; and
  - vi. If stung by bees or wasp, seek immediate medical attention.
- b. To avoid snake bite:
  - i. Always ask about snakes from local residents and employ local resident as a guide;
  - ii. When walking, keep your eyes on your path and avoid stepping into clumps of vegetation;

- iii. Do not step over logs or large rocks if you cannot see over them;
- iv. Wear long pants and long-sleeves shirts;
- v. Wear heavy high top shoes or boots, protective gloves, and use walking sticks;
- vi. Do not kill non-poisonous snakes, they keep the food supply low and keep the population of poisonous snakes down;
- vii. Never pick up an apparently dead snake with your bare hands. Even severed snake head can inflict a deadly bite for 15 - 30 minutes after separation from the body. Should it be necessary to move the dead snake, use a stick; and
- viii. If bitten, seek medical assistance at the nearest clinic or hospital, vials or antivenin shall be approved and supplied by the Research Institute for Tropical Medicine (RITM).

c. To avoid leeches:

- i. Wear long pants and long-sleeves shirts;
- ii. Wear heavy high top shoes or boots, protective gloves, and use walking sticks; and
- iii. During rest, find a spot with direct sunlight, leeches do not exist in dry and hot places.

## **BB. Geohazards Requirements**

- 1. The Employer shall establish a geohazard assessment team and mandate;
- 2. The team shall identify the presence of geohazards within the contract area and/or nearby vicinities, thru the inventory of landslides, flooding, and rock fall prone areas;
- 3. The Employer shall initiate mitigating engineering and administrative measures and formulate emergency/contingency plans;
- 4. The team shall meet annually or as the need arises;
- 5. All Workers and the communities shall be properly informed of the major geohazards, thru posting of illustrations in the form of schematics (i.e., maps, posters, signages and drawings) in public places; and
- 6. In the occurrence of geohazard events such as landslides, earthquakes and floodings, the Disaster Emergency Preparedness/Contingency Plan and Response Team shall be deployed to the concerned area.

## **SECTION IV. Power Plant**

### **A. Power Plant Safety**

- 1. All Workers shall be qualified and trained in their respective job assignments;

2. All Workers shall undergo occupational safety and health orientation and training;
3. All Workers shall immediately report any observed unsafe condition, incident and accident in accordance with the established company safety reporting procedures and guidelines;
4. All Workers shall be required to wear appropriate and prescribed PPE in accordance with Section III.A.2 hereof;
5. Only Authorized Personnel shall conduct repairs and calibration to any plant equipment and instruments;
6. All power plants shall establish work procedures for:
  - i. Start-up and Shut-down;
  - ii. Emergency;
  - iii. Normal and Abnormal Operation; and
  - iv. Operation and Maintenance Work for the following:
    - o Pressure Vessel;
    - o Pumps;
    - o Condensers;
    - o Cooling Towers;
    - o Turbines and Generators;
    - o Electrical and Instrumentation; and
    - o Fans and blowers.

Such procedures shall include hazard identification, analysis, mitigation and emergency response; and

7. All works shall be covered with appropriate work permit system.

#### **B. Control Room Safety**

1. Only Authorized Personnel are allowed to manipulate control panel knobs, buttons, and switches. Bystanders are not allowed inside the control room unless authorized;
2. Air conditioning unit should be kept running twenty-four (24) hours a day to maintain the control room temperature and to keep the air clean and filtered;
3. The door of control rooms should always be closed to reduce outside air infiltration/cooling loads and H<sub>2</sub>S contamination;
4. Control rooms are "NO SMOKING" areas and such policy shall be observed at all times;
5. LOTOTO procedure and proper clearance from the authority shall be strictly complied with;

6. Automatic/emergency lighting system shall be provided at all access and means of egress;
7. The door of circuit breaker/panel should always be kept closed;
8. Control and power meter panel shall have safety floor markings; and
9. Emergency button of the control panel shall have interlock and cover to prevent accidental operation and would cause force shutdown of the power plant.

#### **C. UPS and Battery Bank Room Requirements**

1. Only Authorized Personnel are allowed to enter the room;
2. Air conditioning unit must be operated twenty-four (24) hours a day at temperature not greater than 15°C for electronic equipment cooling;
3. The door of UPS and battery bank room should always be closed to reduce outside air infiltration/cooling loads and H<sub>2</sub>S contamination;
4. Battery bank should be kept free from leaking solutions;
5. Battery room should not be used as dressing room;
6. The exhaust ventilation must be placed in accordance to PSME Code. A spare fan should be readily available;
7. The direct current (DC) system shall be readily available whenever the DC power is interrupted to the system;
8. Eyewash station must be provided near the battery room;
9. Check-up of battery electrolyte leak and specific gravity should be done regularly; and
10. Proper handling, storage, and disposal of unserviceable batteries should be observed in compliance with regulatory requirements.

#### **D. Equipment Repair and Troubleshooting in Electrical Power Facilities**

1. Never attempt to execute troubleshooting and repair of any line conductors and electrical equipment and circuitry at control panel board without permission and proper coordination with area supervisor;
2. Always wear electrically rated safety shoes when performing troubleshooting and repair of any faulty line conductors encased in metallic cable tray;
3. Place warning tags (indicating reasons for isolation) on any circuit cut-out/breakers with the requested "DE-ENERGIZE" line associated;

4. Insulate all dangling and bare terminals of power conductors right after disconnection;
5. De-energize all power line conductors and use voltage detector to ensure the line is safe, when troubleshooting and repairing all electrical works;
6. Ensure all electrical tools/equipment used are properly insulated and must be capable to handle the voltage of the work piece;
7. Conduct insulation resistance testing on any line conductors and equipment being repaired and/or replaced prior to re-energization to determine the di-electric strength of the insulation; and
8. Advise superior immediately any faults, tripping or hazards observed on any electrical equipment or installation.

## **SECTION V. Biomass Facilities**

### **A. Feedstock Storage**

1. Risk assessments and method statements for the storage of biomass should have been prepared;
2. Access to biomass storage areas shall be restricted to Authorized Personnel only;
3. Traffic patterns shall be established in biomass storage areas to ensure a safe and efficient flow of traffic;
4. There shall be sufficient space in biomass storage areas for biomass delivery trucks and heavy equipment to allow the safe and efficient access to the biomass;
5. Biomass storage areas shall have good dust control and proper ventilation;
6. Appropriate stacking limit shall be observed when storing biomass;
7. The capacity of biomass storage areas shall be well-defined and not exceeded;
8. Applicable PPE's shall be utilized at all times;
9. Biomass which does not meet quality specifications, contaminated and rendered unusable shall be removed or disposed of in accordance with environmental rules and regulations;
10. Efficient monitoring and recording of the quantity of biomass entering or leaving the storage areas shall be practiced;
11. Appropriate measures shall be taken in order to mitigate noise, dust concerns and the occurrence of off-site odor;

12. Control measures shall be in place to avoid on-site biomass decomposition;
13. Biomass storage areas shall be clearly signed with warning signs strategically located;
14. Appropriate fire protection systems and/or equipment shall be maintained in biomass storage areas in accordance with the Fire Code of the Philippines and other applicable laws;
15. In the absence of automatic fire detection systems, there shall be frequent fire watch patrols in biomass storage areas;
16. Whenever possible, storage of biomass in open areas shall be avoided;
17. Biomass exposed to the weather shall be properly managed, controlled and protected so as to avoid the occurrence of potential hazards;
18. If open area storage cannot be fully avoided, prevailing winds and proximity of neighboring properties shall be considered in the storage of biomass;
19. Appropriate covering material shall be provided to biomass stored in open areas when there is a possibility of biomass being carried away by prevailing winds;
20. To avoid contamination, surface run-off from surrounding areas shall be directed away from biomass storage areas;
21. Proper storm-water and surface run-off management practices shall be established in biomass storage areas; and
22. The biomass storage capacity should be sufficient and designed for the longest time between deliveries.

#### **B. Conveyor System**

1. Allow only authorized personnel to start up, operate and interrupt the normal operation of a conveyor;
2. Make sure all personnel are clear of moving parts before starting the conveyor;
3. Do not operate the conveyor without the motor guards in position;
4. Do not wear loose clothing or accessories where such clothing may be caught in moving parts of the conveyor;
5. Maintain good housekeeping in the vicinity of the conveyor at all times; and
6. Do not allow operators to carry out repairs or maintenance on the conveyor system while it is moving.

### C. Cooling System

1. Only authorized personnel are allowed to enter the vicinity of cooling tower.
2. Proper PPE shall be observed inside the working areas.
3. Preventive maintenance shall be performed to rid any debris as well as to clean fill sections that are present.

### D. Boiler System

1. Boilers shall be constructed in accordance with the procedures/process of the standards requirement under rule 1162 of OSHS 1989.
2. Authorized and trained workers shall only be allowed to operate a boiler under the supervision of qualified personnel (Boiler Supervisor and Registered Engineers).
3. Safety precautions should be followed when operating boilers, burners, and fuel system.
4. Good housekeeping should be maintained to promote safety and good plant operation.
5. Wearing of Personal Protective Equipment (PPE) should be followed at all times.
6. Lockout and Tag out procedures must be followed, attached signs to equipment such as **"DO NO START MEN AT WORK"**.

### E. Power House

1. Steam-Turbine Generator (STG)
  - a. Only qualified/trained persons are allowed to work on STG during installation, operation and maintenance;
  - b. Installation, repair and maintenance should always be in accordance with the manufacturer's instructions and recommendations;
  - c. The area around the generator must be clean and any combustible material that can be hazardous;
  - d. The unit should not be opened or dismantled while it is functioning. Moving or hot parts should not be tampered with. Battery cables should be disconnected before proceeding to work on the generator to eliminate any possibility of an accidental start-up;
  - e. All electrical connections, such as wires, cables and terminals must be properly insulated and covered, and should not be touched with bare



hands or while in contact with water. This is essential to prevent the occurrence of an electric shock;

- f. The frame of the generator and any external conducting parts should have proper grounding wiring. This should never be disconnected; and
- g. Safety signs and labels should be installed near the generators to remind everyone and follow established safety procedures.

## 2. Cooling Tower And Condenser

- a. Only qualified persons shall performed installations and maintenance work; and
- b. The correct function of all safety devices should be checked in accordance with the manufacturer's safety manual.

## **F. Switchyard/ Substation**

- 1. Only qualified/trained person is allowed to work on substation/switchyard. Such person shall be capable of working safely on specific voltage, familiar with the proper use of precautionary techniques and personal protective equipment;
- 2. Proper clearance from exposed energized parts of installation should be implemented to avoid accidental contact with them. Also, switchyard should have perimeter fence following standard size/clearance:
- 3. There should be sufficient illumination for personnel to clearly see their surroundings and perform the work safely;
- 4. All passageways should be wide enough for personnel to navigate safely; and
- 5. All metallic structures, fences, and equipment tanks should be connected to a station ground grid which should be designed to ensure that step and touch potential values are lower than the ones stipulated in the applicable standards.

## **G. Pollution Control**

- 1. Disposal of waste such as wastewater, fly and bottom ash should adhered government rules and standards;
- 2. Emission of flue gas should be in accordance with Philippine clean air act;
- 3. Electrostatic precipitator, Filters and smoke stack should be checked regularly to prevent ash build up;
- 4. Sludge and scums should be disposed properly in drying beds;

5. Proper aeration of lagoon should always be maintained to prevent foul odor;
6. Trash bin should be provided for disposal of solid waste; and
7. Good practice of waste segregation should be observed within the plant.

## **H. Biogas Systems**

### **1. DIGESTER**

- a. Adequate ventilation shall be ensured around gas lines;
- b. Gas lines shall be frequently inspected for signs of damage or leak;
- c. Gas-tight pipes and valves shall be used to prevent gas leaks especially in confined areas;
- d. Smoking shall be prohibited near the digester or related biogas lines and equipment;
- e. H<sub>2</sub>S safety shall be implemented in accordance with section III.P.;
- f. Frequent gas detection and monitoring shall be conducted to determine dangerous gas levels and detect leaks which may endanger personnel;
- g. Access and operation of anaerobic digestion related equipment shall be restricted to Authorized Personnel only;
- h. When servicing or doing repairs of biogas equipment and related gas lines, explosion-proof equipment and non-sparking tools shall be utilized;
- i. Potential source of sparks or flame shall be identified and removed from areas where biogas is present;
- j. Appropriate fire protection systems and/or equipment shall be established in areas where biogas is present;
- k. When handling waste material, appropriate precautions shall be exercised by using PPE to avoid contact with wastes or manure;
- l. Never enter an area or a facility where wastes or manure are stored or where there is a suspected biogas leak without wearing the appropriate PPE;
- m. Adequate lightning protection systems shall be put in place when there is danger of lightning strikes particularly in areas where biogas is present such as the digester and gas holder;

- n. Smoking and open flames shall be prohibited in the general vicinity of the digester including gas lines;
- o. Proper warning signs shall be established on conspicuous places to warn individuals of the explosion or fire risk associated with anaerobic digestion systems;
- p. Wastes or manure handling systems and storage structures shall be posted with warning signs;
- q. Appropriate PPE's shall be used when undertaking maintenance, repair and other related works at anaerobic digestion structures;
- r. Safety relief valves shall be installed to prevent over pressurization of both high and low pressure biogas systems; and
- s. Spark generating gadgets/devices shall not be allowed inside the biogas facilities premises.

## 2. Landfill Gas

### a. Gas Extraction, Well Drilling And Construction

- i. Smoking shall not be allowed during drilling of gas extraction wells;
- ii. The well hole shall be covered and all pipes shall be capped at the end of the work day;
- iii. Open excavations or drill borings shall never be left unattended, unmarked or unsecured;
- iv. An exhaust hood shall be used, if possible, to reduce exposures to landfill gas vapors;
- v. H<sub>2</sub>S safety shall be implemented in accordance with section III.P.;
- vi. Periodic monitoring of dangerous and/or combustible gases shall be conducted when working at gas extraction wells; and
- vii. Appropriate PPE shall be used (e.g. respirators, breathing apparatus) when lethal concentrations or high levels of dangerous gases and/or combustible gases are detected.

### b. Landfill Excavation, Trenching And Pipe Installation

- i. Trenching and excavation safety procedures (e.g. fall and other hazards) shall be implemented;

- ii. The atmosphere shall be tested in excavations deeper than three (3) feet before personnel are allowed to enter the space. Depending upon the test results, the appropriate respirator device shall be used;
- iii. Appropriate PPE shall be worn to protect against direct exposure to the excavated waste;
- iv. Soil shall be stockpiled near the excavation to smother any combustion that might occur;
- v. Electrical motors shall be non-sparking or explosion proof and construction equipment shall have a vertical exhaust at least five (5) feet above landfill grade;
- vi. Welding shall not be permitted in or near the work area, unless it is verified on a continuous basis that methane and other combustible gases are not present;
- vii. As pipes are assembled, valves shall be closed to prevent landfill gas migration through the system; and
- viii. Gluing, bonding, or solvent pipe cleaning shall be performed outside the trench to the fullest extent possible.

#### **I. Pyrolysis/ Gasification System**

- 1. All potential ignition sources shall be avoided;
- 2. Air inlets and gas outlets to and from the gasifier including fuel feeding section, flare and engine shall be equipped with appropriate anti-backfiring valves;
- 3. Valves used to ensure a safe mode in case of failure and emergency stop shall be of the fail safe type;
- 4. All gas conducting parts shall be properly grounded;
- 5. Gas/ air inlet into engines shall be earth grounded and shielded cables shall be used;
- 6. Safety shut off valves shall not be bypassed.
- 7. Tampering of safety related devices shall be prohibited;
- 8. Gas shall be flared at start-up and emergency shutdown or in the case where valves get stuck;
- 9. Start-up checks and regular inspection of sensor devices shall be conducted;
- 10. Gas monitoring shall be strictly monitored especially in sections;

11. Proper segregation and disposal of liquid influent and solid wastes shall be properly maintained; and
12. Proper storage of municipal solid waste (MSW), refuse derived fuel (RDF) or solid recovered fuel (SRF) shall be observed and maintained, these feedstock materials have higher potentials of fire hazards, dust explosion and toxic gas formation.

## **VI. Biofuel Facilities**

### **A. Feedstock Storage (CNO, Molasses, Sugarcane, And Other Biomass Feedstock)**

1. Roads, pathways and bay areas should be paved and clear of obstruction;
2. A maximum speed limit of 8kph shall be observed within the plant vicinity;
3. Feedstock should be stored properly according to its appropriate location; and
4. Proper maintenance of storage tanks/warehouse should be ensured by conducting regular inspection.

### **B. Production System (Fermentation, Esterification and Distillation/ Dehydration, CO<sub>2</sub> Recovery)**

1. "No Smoking" Policy within plant vicinity should be observed;
2. Bringing and using of any electronic devices is strictly prohibited in the bioethanol production plant;
3. Repairs and maintenance within the production whether operation or shutdown shall secure permit issued by Safety Officer or any authorized personnel;
4. Employee not assigned in the area shall not be permitted to enter unless permitted by in-charge personnel;
5. All Employees should strictly follow Plant rules and regulation upon doing any work activities;
6. Electrical fixtures, electrical motors, devices and installations shall be explosion proof type;
7. Hot works will only be allowed unless air and steam purging are accomplished according to established safety procedures;
8. Roofs must be free from holes, cracks or any form of harm;

9. Mechanical equipment use for production should be inspected/ check regularly; and
10. Hot pipelines, storages shall be leak free and shall be in good condition.

**C. Wastewater Treatment**

1. Effluent parameters shall pass standard requirements and specifications in accordance to DAO 2016-08;
2. Conduct regular inspection, sampling to maintain standards set by government requirements. Reports shall be made by safety officer and pollution control officer; and
3. Ensure waste water effluent shall be properly inspected by Pollution Officer (oil separator, neutralization, aeration pond, settling pond) ensure specifications are met).

**D. Storage Tank (Methanol, Denaturant, Finished Product, Glycerine, Hydrous Ethanol).**

1. Only authorized and trained personnel are allowed to operate in the area;
2. Valves and faucet of storage tanks for drawing of biofuels should be inspected regularly of any rupture, leaks;
3. Denaturing should be monitored under the supervision of authorized/ trained personnel;
4. Roads, pathways and bay areas should be paved and clear of obstruction; and
5. Appropriate grounding systems, lightning and surge arrester shall be installed.

**E. Loading Bay**

1. Loading and unloading should be conducted only at designated locations;
2. Parking brakes and chokes should be secure to prevent vehicle motions;
3. Authorized personnel should be present during the entire time of unloading and loading procedure; and
4. Tank trucks bond-wire should be properly connected.

**F. Laboratory**

1. All visitors must be accompanied by authorized personnel when entering the laboratory;

2. All chemicals must be properly labelled;
3. Personnel should know appropriate procedures for emergencies, including location and operation of all emergency equipment installed;
4. Personnel should be aware of symptoms of overexposure and chemical characteristic (i.e. odor, appearance);
5. Chemicals used for tests and experiments should not be left unattended;
6. Fume hood should be used in handling hazardous chemicals;
7. First-aid kit and safety equipment should be available at all times and be regularly inspected/ monitored; and
8. Disposal of toxic and hazardous waste shall be in accordance to RA 6969.

#### **SECTION VII. Separability Clause**

In the event that any provision of this Department Circular or the application of such a provision to any person or circumstance is declared invalid, the remainder of this Department Circular and the application of such a provision to other persons or circumstances shall not be affected by such declaration.

#### **SECTION VIII. Resolution of Conflicts and Overlapping Jurisdictions**

In case any provision of this Department Circular conflicts, duplicates or overlaps with rules and regulations being implemented by other government agencies, such conflict, duplication or overlapping shall be resolved by coordination or any other means of cooperation among such agencies.

#### **SECTION IX. Repealing Clause**

All biomass/biofuel safety, health and environment rules and regulations, orders or parts thereof which are inconsistent with or contrary to the Code are hereby repealed, amended, or modified accordingly.

#### **SECTION X. Effectivity**

This Department Circular shall take effect fifteen (15) days following its publication in the *Official Gazette* or in two (2) newspaper of general circulation.

Fort Bonifacio, Taguig, Metro Manila

  
**ALFONSO G. CUSI**  
Secretary



Republic of the Philippines  
DEPARTMENT OF ENERGY  
IN REPLYING PLS. CITE:

DOE-AGC-21003508



JUN 11 2021