

## **LEAK TEST PROCEDURE**

All piping shall be pressure tested after the construction and before being placed in operation to prove it has adequate strength for the purpose and that it does not leak. Testing shall not commence until at least one joint to allow sufficient time for the joint to cool.

### **External Piping (from outlet of service station to valve)**

- 1) Close and plug or cap all opening completed lines.
- 2) Install pressure gauge (0 - 300 psig) to each completed line for pressure indication (refer to figure 1)
- 3) Pressurized each completed line to a pressure of 90 psi measure with a pressure gauge. (point A and point B)
- 4) Testing medium - Nitrogen
- 5) The piping will be checked with soap and water solution.
- 6) The pressure will be held for a period of 24 hours. If there is no visible loss of pressure after 24 hours, the line will be deemed to be gas tight.
- 7) If a pressure gauge indicated the pressure drop, the testing operations connection and shut-off valve be first rechecked for leak and tightened as necessary.
- 8) If a pressure drop is still evident, then all joints and lastly the piping itself will be checked with soap and water solution.
- 9) LW Gastech Engineering Sdn. Bhd. representative(s) shall carry out the testing work.
- 10) The representative(s) of JKPP, Gas Malaysia Sdn. Bhd. and Owner will witness the testing work.

## **SITE SAFETY PROCEDURE**

### **Purpose**

This chapter sets out the principles for the organization of safety in all aspects of LW Gastech Engineering Sdn. Bhd. operations in accordance with LW Gastech Engineering Sdn. Bhd. policy on safety.

The requirements of this chapter will apply equally to subcontractors working for LW Gastech Engineering Sdn. Bhd. in its areas of operation as LW Gastech Engineering Sdn. Bhd. organization.

LW Gastech Engineering Sdn. Bhd. policy of safety, health and environment.

### **Policy Statement & Objectives**

LW Gastech will conduct its operation in such a manner as to :-

- Provide a safety working environment.
- Protect the general public and personal from injury or ill health and prevent properties from loss or damage resulting from its related activities.
- Safeguard the conservation of the environment
- in addition to reducing individual suffering & loss, LW Gastech firmly believes that the policy will contribute positively to the company's efficiency and business success.

### **Safety Targets**

In taking steps to ensure a safety working environment, LW Gastech & subcontractor employees are to aim for :

- No fatalities and / or injuries.
- Prevention of lost time and any other significant accidents.

### **Implementation Aspects**

The policy is implemented with special attention to following specific aspects :-

- The requirements of the relevant government legislation are followed
- In addition, LW Gastech standard, procedures & regulation will be applied.
- Working or job instruction during or before implementation must pay due regard to safety requirements.
- All works carried out, is effectively monitored by LW Gastech staffs.

### **Responsibilities**

- Every employee is responsible for its own safety and the safety of his fellow colleagues.
- It is very important that accident & incidents are reported to avoid recurrence.
- Construction equipments, site material and other, to be located at destined area.

### **Duties and Responsibilities**

#### **Manager's Responsibility**

Ensure that working practices and attitude are adopted, and that conform to the policy laid by LW Gastech Engineering Sdn. Bhd.

Ensure that accident are adequately investigated and effective measure taken to prevent recurrence.

Ensure that effective corrective measure are taken to eliminate hazardous conditions and practices.

#### **Project Engineer's Responsibility**

Set good examples in adopting safe behaviour.

Ensure that all workmen obey safety rules and follow safety procedures and practices.

Investigate accidents fire and dangerous accuracies and take effective remedial action to prevent repetition.

Maintain good housekeeping in all areas under their control.

### **Sub-contractor's Responsibility**

The sub-contractor's employee shall be made fully aware of the safety regulation applicable to the work site including the work system e.g. smoking regulation, welding, cutting etc.

The sub-contractor shall ensure that its employees are provided with the appropriate safety and personal protection equipment.

### **Worker's Responsibility**

Carry out their duties in a safe manner and with due regard to health and incidents.

Report all hazard condition to their immediate supervisor without delay.

Wear protective equipment correctly as and when required and maintain these in good order.

## **General Safety Requirements**

### **Prevention of Accidents**

Accidents are unwanted or unexpected occurrences generally

cause by persons indulging in unsafe practices or

create unsafe conditions

or used of unsafe equipment

All accident can be prevent if personal conscientiously try to avoid and eliminate unsafe practices & conditions

## **EVERY PEOPLE HAS THE RESPONSIBILITY TO ACT POSITIVELY TO PREVENT ACCIDENT FROM OCCURRING.**

### **House Keeping**

Good housekeeping at all work areas is essential to accident's prevention of injuries and fires.

Removes all scar, broken or unwanted parts of equipment from works areas.

Places steel bars, cables properly to avoid tripping hazards

Clean up spillages immediately.

### **Personal Protective Equipment**

Always use personal protective equipment when the job and the condition warrant is use

Protective footwear must be worn at worksite

Occasional visitor can be exemption from wearing safety footwear

Use of other personal safety apparel, such as goggles, gloves etc. is mandatory when the circumstances distaste this.

### **Tools & Equipment, Machinery**

A visual inspection should be made each day, or before each use, and / or by the user to ensure

that tools & equipment are in safe operation conditions.

#### Area of Restricted Access

For safety and security reasons, the site to which access is restricted.

Smoking is strictly prohibited at site.

#### **Alcohol & Drugs**

It is strictly forbidden to consume or be in of alcohol and drugs at site.

#### Fire Fighting Equipment

Portable carbon dioxide fire extinguisher is provided

#### **First Aid**

If an accidents occur and there are people injured, the first priority is to save lives. Any injured person should be given prompt first-aid treatment and such medical attention as may be necessary.

First-aid kit is to be displayed in the site office.

#### **Engineering Construction**

##### Cutting & Welding (Fabrication of Piping)

No unauthorized person shall be allowed to use welding equipment.

Personal protective equipment must be worn during welding & cutting which shall included goggles, face shield.

When welding is cutting & welding on a line, no one should work in front of near the open end.

Current must be turned off when equipment is not use for a period of time.

In changing welding electrodes, care must be taken to avoid making contact with other sides of the circuit.

Welding is done in restricted area. Never attempt any work which is out side the parameters of the work barrier.

#### **Civil Works (Not in this scope)**

Only personal who are physically suitable can be employed for the jobs.

##### Assembly and installation

No smoking shall be allowed within or in the vicinity of works site.

Matches or lighters is prohibited

During installation of service stations, do not works or walk under the load of crane in operation.

No welding is allowed.

#### **Accidents & Emergencies**

##### Statuary Requirements

There are several enactments in the states relating to statutory requirements in the reporting of accidents. The principle of these are :-

The labor Ordinance

Workmen's Compensation Act

F & M Act

Reporting Procedure for accident, fire emergencies

All workers witnessing in accident should inform their supervisor as soon as possible.

In the case of accident, the site personal concerned must make a report.

## **COMMISSIONING PROCEDURE**

### **GENERAL**

### **SCOPE**

This document describes the general procedure information and instruction necessary for the commissioning of gas pipeline system.

### **REGULATION, CODES & STANDARDS**

All labour, material and equipment shall be governed by the latest applicable codes and standard.

ANSI B31.8	~ Gas Transmission and Distribution Piping System
MS 830	~ Code of Practice for Storage, Handling and Transportation of Liquidified Petroleum Gases.
MS 930	~ Code of Practice for the installation of Fuel Gas Piping System And Appliances.
Gas Supply Regulations 1997	~ Suruhanjaya Tenaga

## **COMMISSIONING ORGANIZATION**

### **COMMISSIONING ENGINEER**

LW Gastech Engineering Sdn. Bhd. will nominate a Commissioning Engineer and will have sole charge of the entire operation. CLIENT shall nominate an individual who will be the CLIENT commissioning coordinator with particular responsibility for the commissioning phase.

The commissioning engineer will be responsible for the planning, organization and supervision of all activities from the stage of pre-commissioning to commissioning, assisted by his team of engineer, supervisors, technicians, vendor representations and laborers etc.

The commissioning engineer will be responsible for all interfacing with CLIENT commissioning coordinator.

### **COMMISSIONING PERSONNEL**

For commissioning purposes, the following shall be the minimum requirement :-

- i) Group Leader ~ 1 no (LW Gastech Engineering Sdn. Bhd.)
- ii) Client Representative ~ 1 no (CLIENT)
- iii) General Workers ~ 3 no (LW Gastech Engineering Sdn. Bhd.)

One group will be situated at the gas injection point with the other group at the end of a commissioning section.

The commissioning engineer will take full charge of the commissioning activity from the central control initially at the source of the gas i.e. at the existing future take-off and when appropriate, be relocated to locations along the pipeline system or at the downstream interface, as and when deemed necessary by the chief commissioning engineer.

## **COMMUNICATION**

Communication between the various groups engaged in commissioning will be via multi-channel radio system and / or mobile telecommunication system.

As a minimum, communication equipment will be provided to as follow :-

Commissioning Engineer  
Individual Group Leader  
Reference Test Gauges Locations

This telecommunication equipment will be manned continually during the entire commissioning operation; communication traffic will be restricted to messages directly related to commissioning.

## **NOTIFICATION OF AUTHORITY**

The Police, Fire Authorities and all other relevant parties shall be given advance notice of the dates of the commissioning operations.

## **SAFETY CODE OF PRACTICE FOR COMMISSIONING**

### **SCOPE**

This section provides a general guide to safe practice during commissioning to take reasonable care for the health and safety of himself and of other person who may be affected by his acts or omissions.

It is therefore the person's duty to:-

Always adhere to safety regulations.

Always use the procedures and methods of operation laid down in this procedure and the local rules and regulations.

Always use the correct tools and equipment for the job, and wear the correct protective clothing.

Immediately report any hazard to the appropriate authority.

Never operate valves, unless instructed to do so, or as part of his duties.

Commissioning engineer acting in a supervisory capacity have the added responsibility of making sure that all person under their control or direction are aware of the safety regulations, work procedure and equipment provided for their protection, and that they are properly used. When acting in a supervisory capacity they must therefore:-

Have a detailed knowledge of safety regulations.

Include in all routine orders, specific instructions regarding safety.

Restrain personnel from taking unnecessary risks.

Ensure that all personnel under their control or direction are familiar with safety requirement of the job.

Stop any dangerous work practice immediately and report any such actions to the appropriate authority.

Rectify or report any defect in plant or equipment that may affect safety taking any necessary.

Set a personal example in good safety practice at all time.

These recommendations are supplementary to the Construction Safety Instructions and the directions from the Safety Officer.

## **SAFETY OFFICER**

The Safety Officer will be responsible for all aspect of safety control and prevention of accidents during the testing, commissioning and hand-over operations period.

### **Responsibilities**

The safety office shall take overall responsibility for the enforcement of the Safety Regulation and other safe working practices contained in these Procedures including :-

Co-ordination of safety measure where construction work has, of necessity, to be carried out alongside machinery and equipment under test or being commissioned.

Ensuring that, before entry onto the site, all supervisory, construction and operating personnel are fully conversant with the Safety Regulations on work procedures in force.

Ensuring that all personnel are equipped with and use of appropriate protective clothing and that all hazard warning signs and devices, notices and barriers are installed and maintained.

Carry out routine inspection on fire fighting equipment and first aid facilities, and check these are in place and are properly serviced.

Stopping any dangerous work practice and immediately reporting them to the commissioning engineer.

## **HOUSEKEEPING**

The Safety Office shall be responsible for ensuring the following :-

Floors, walkways and stairways are kept free from obstructions at all times.

Oil spillage and similar hazard are cleaned up immediately.

Refuse bins are provided and marked clearly to separate metal scrap, refuse from any material liable to spontaneous combustion, arrangements are made for the regular emptying and safe disposal of the contents.

Suitable notices should be prominently displayed to warn personnel of regulations regarding access. naked lights, smoking or other hazards.

## **WORK PERMITS**

A Work Permit System should be introduced at the commencement of commissioning. One specific have been introduced into a work area, work shall not commence until a work permit has been issued by the commissioning engineer.

The objective of the permit to work system will be to protect personnel working in hazardous areas such that :-

Only the central authority, at a time, can issue permits to allow personnel working in hazardous area.

Only personnel involved in the task and covered by the permit can enter the area.

All personnel concerned are made aware of the hazards involved and measure to be taken.

The area is clearly defined.

The right of personnel to enter and work in the area is limited to a stated time.

Adequate suitable protective clothing and equipment are provided and used.

## **MEDICAL SERVICES**

Adequate medical and first aid facilities shall be available at any location where commissioning work is in progress to provide prompt treatment of injuries.

The safety officer shall also ensure that evacuation transport facilities are available on a standby basis in the event of an emergency occurring during pre-commissioning and commissioning.

## **OPERATION SAFETY**

All personnel involved with the commissioning operations should be familiar with the safe action to take under emergency condition.

report the emergency to the commissioning engineer and safety officer for assistance if required.

In case of emergency, conditions (fire, explosion, gas leak, etc) the following action is required.

All personnel, other than those assigned to fire fighting duties, shall assemble outside the main exit gate for a head count.

All personnel to be accounted for and nay injured persons removed to safety. Any mission personnel to be located quickly by a systematic search by a nominated search team.



All fire fighting facilities to be manned.

Investigate damage, repair and return the station to operational status.

## **MATERIAL REQUIREMENT**

The following list of materials, consumable items, tools and equipment represent the basic requirement of the commissioning activities :-

Vendor drawing and operating manuals, if required. (A complete set available at the central commissioning control location and relevant documents).

Equipment test and inspection Certificate to be available for disposal by the commissioning engineer.

Suitable range of hand tools, spanners, socket sets etc. (On set each for the central commissioning control location and individual commissioning groups).

Lubrication equipment, grease guns, lubricant etc. (one set each for the central commissioning control location and individual commissioning groups).

1 unit of oxygen detector.

Communication Equipment - Multi channel radio system and / or mobile telecommunication system.

"Snoopy" leak detection fluid.

## **SCHEDULE OF OPERATION**

### **STATUS PRIOR TO COMMISSIONING**

Commissioning can commence only after :

Hydrostatic / pneumatic testing completed.

Functional testing of all equipment completed.

Commissioning site cleaned.

### **PURGING OF THE PIPELINE SYSTEM OF AIR**

With all pre-commissioning activities completed to the satisfaction of the commissioning engineer, and all liaison with upstream and downstream interface in-place, the commissioning engineer may start purging the pipeline system of dry air with the introduction of nitrogen to flood the entire pipeline system.

Once the entire pipeline system is purged until free of air, natural gas will then be introduced in sections. Pressurization of the pipeline sections will be steps to facilitate leak-checking exercise. Once the pipeline is fully pressurized, we will purge the system until 100% LEL is achieved.

Branch pipe work connection associated with the main pipeline system will be purged separately of nitrogen.

A detail commissioning procedure shall be forwarded prior to the proceedings.