INTERPLANT STANDARD - STEEL INDUSTRY		
IPSS	**CODE OF PRACTICE FOR PROTOCOL FOR SHUT DOWN AND REPAIR WORK ON OXYGEN, NITROGEN, ARGON AND ACETYLENE DISTRIBUTION PIPELINES**	**IPSS:1-06-045-08**
	NO CORRESPONDING INDIAN STANDARDS EXISTS	

0.1 **FOREWORD**

This Inter Plant Standard prepared by the Standards Committee on Pipes, Fittings, Valves and Piping Layout, IPSS 1:6 with the active participation of the representatives of all the steel plants and associated organization in the field was adopted in August 2008.

0.2 Inter Plant Standards for steel industry primarily aim at achieving rationalization and unification of parts and sub-assemblies used in steel plant equipment and accessories, and provide guidance in indenting stores or equipment for existing or new installations by individual steel plants. It is not desirable to make deviations in technical requirements.

1. **SCOPE**

1.1 This standard covers guideline for protocol for preparing shut down protocol for oxygen, nitrogen, argon acetylene gas pipelines.

2. **DEFINITION**

2.1 Protocol is a procedure / order to be followed for obtaining a shutdown of a unit or a system under operation for restricted period within a specified area.

2.2 It is also a document which lists the activities sequentially for the work to be taken up along with the person responsible for each activity.

2.3 The protocol also lists all safety measures to be taken while shutting down a pipeline during the execution of work and recharging the pipelines after the work is complete.

3. CONTENTS OF PROTOCOL

3.1 Following points shall be covered in the protocol:

i) Location and unit of work place.

ii) Nature and necessity of the work to be carried out.

iii) Time of commencement and expected duration of the work.

iv) Name of the coordinating department for the work.

v) List of agencies during execution of work.

vi) Name of the overall coordinator for execution of the work.

vii) List of preparatory jobs to be completed prior to the commencement of the actual work.

viii) List of tools and tackles, mobile equipment like crane and any other special equipment required.

ix) List of safety provisions and facilities like rescue gadgets, ambulance and fire safety equipment.

x) Sequence of the activities for carrying out the work with name of person responsible for each activity.

xi) List of safety precautions to be taken/observed by working personnel with the name of the supervisor.

xii) A schematic diagram showing the gas and indicating the location of each activity in effective area.

xiii) List of departments / units effected due to shut down.

4. SCOPE OF WORK

4.1 A protocol shall be prepared for carrying out maintenance activities for charge or isolated gas lines associated system as per the format at Annexure-I.

4.2 For work within a department, the protocol shall be proposed by the executing department under whose charge the work is to be carried out. It shall be signed by executing agency, maintenance agency, departmental safety officer and concerned person from the safety engg. Department, Energy Management Deptt, Fire Service and the document shall be approved by the head of the executing department.

4.3 For job covering / affecting more than one department, the signature of their HOD shall be taken and protocol shall have the signature or approval by divisional head/head.

4.4 For the work covering larger area in interplant, signature of all the affected / involved department shall be taken on the protocol. Such protocol shall be approved by head of the plant/work.

4.5 For the work of the repeated nature, a standard protocol may be prepared in consultation with all concerned agencies and used every time after revalidation by HOD or head of the division or plant, as the case may be with fresh signature with date.

5. GUIDELINES FOR PREPARATION OF PROTOCOL

4.1 Meeting / discussion shall be held among concerned agencies/department.

4.2 A meeting shall be convened by the executing department for explaining the purpose and scope of work requiring shut down.

4.3 Head of operation and mechanical maintenance and other representatives of the department getting affected by the shut down shall be called for the meeting.

4.4 Drawing/sketch indicating interconnection with consumer getting affected, location of the valves, water seal, flanges, etc shall be prepared. The sketches shall get vetted by the concerned department.

4.5 Following points shall be clearly marked in the sketch :

- Valves to be closed / blanked
- De-pressurization point
- Water seal to be operated
- Purge in point and purge out point

4.6 Single point responsibility by name, designation and phone number for giving clearance for shut down and charging the line after shut down shall be decided.

4.7 Single point clearance from individual department getting affected for obtaining clearance and giving clearance for line charging.

4.8 Other essential services required shall be decided.

4.9 Do's and don'ts (during shut down period) for department getting affected by the shut down and the executing department shall also be decided).

4.10 The protocol shall ensure procedure for proper isolation, purging, ventilation, sampling, clearance and supervision.

6. PREPARATORY JOBS

6.1 Following preparatory jobs shall be done before taking the shut down:

i) Bolt servicing

ii) Valve servicing

iii) Pre-fabrication and edge preparation of pipes

iv) Argon cylinder purity checking in case of TIG welding

v) Arrangement for DP test / radiography

vi) Strategy incase of bolts not free

vii) Requirement of scaffolding

viii) Lifting tools

7. **Preparation of the protocol as per Annexure-I.**

8. **SAFETY PRECAUTIONS**

8.1 **SPECIAL SAFETY POINTS FOR OXYGEN**

Following safety measures shall be taken up for working in Oxygen pipe lines:

i) Presence of fire brigade

ii) Work shall not be allowed on a charged oxygen line

iii) Work shall be carried out after isolating the line / equipment by putting a blank after isolating valve.

iv) De-pressurization shall be done only through non-ferrous valve

v) De-pressurization shall be done very slow if pressure is > 25 kg/sq.(g).

vi) If cutting or welding involved, Oxygen line shall be purged with oil free dry nitrogen.

vii) The isolated pipe shall be purged to bring down Oxygen level to 22% maximum.

viii) Any adjacent high pressure gas line or fuel line (within one meter) shall be covered with water soaked gunny bag.

ix) Check surrounding area periodically for oxygen concentration.

x) Welding machine earthing shall not be taken from oxygen pipe line.

xi) Proper arrangement shall be made for ventilating this area.

xii) Oxygen being heavier than air, it accumulates in depressions and non-ventilated area.

xiii) No work shall be allowed in a area having oxygen > 23%.

xiv) Other than fire hazardous, people working must know that working in a oxygen rich atmosphere (>75%) can lead to hyperoxia phenomenon which can prove to be fatal. Therefore, excess of oxygen required should be avoided.

xv) Pipes, valves or any fittings are to be replaced properly and be greased before installation.

xvi) Changing can be done only after filling the line with nitrogen under pressure.

xvii) All tools to be used in the work shall be washed in carbon tetra chloride (CTC) before starting the work to ensure absence of inflammable sticking substances on them.

xviii) The pipe line, equipment etc. shall be cleaned and de-greased thoroughly before charging the line.

xix) Housekeeping in the vicinity of oxygen pipeline shall be proper to ensure sooth working.

xx) Functioning of pressure relief valve shall be checked once in a year and record to be maintained.

xxi) The protection system between liquid and gaseous oxygen shall be checked at least once in a year for ensuring their proper isolation.

xxii) Grease and oil shall not be used in oxygen handling installations. Hydrocarbons shall not be stored in areas having fittings on the oxygen line.

8.2 SPECIAL SAFETY POINTS FOR NITROGEN

Following safety measures shall be taken up for working in Nitrogen pipe lines:

i) The work shall be started only after isolating the / equipment by putting a blank after isolating valve.

ii) A person shall be allowed to enter vessel or area adjoining a pipeline for work only after ensuring presence of 20% oxygen and after permission written permission of competent authority.

iii) Nitrogen is not poisonous but dangerous / killer. In the atmosphere 80-85% nitrogen i.e. 15-20% oxygen, deep breathing and quicker heart beat start. This is the first indication of nitrogen rich atmosphere. People shall leave the area for open space.

iv) Nitrogen being slightly lighter than air and it accumulates at higher place in a non-ventilated area.

8.3 **SPECIAL SAFETY POINTS FOR ARGON**

i) The work shall be started only after isolating the / equipment by putting a blank after isolating valve.

ii) Argon being heavier than air accumulates in depressions and non-ventilated area. Hence ventilation arrangement shall be made.

iii) Other points same as for Nitrogen.

8.4 **SPECIAL SAFETY POINTS FOR ACETYLENE**

i) The work shall be started only after isolating the / equipment by putting a blank after isolating valve.

ii) The following shall be ensured in the vicinity of the acetylene pipeline / equipment

- No manual hammering which may lead to spark.
- No use of sparking tools or instruments.
- No naked fire / smoking shall be allowed

iii) No welding / cutting shall be allowed till

- Pipeline is physically separated from any acetylene source
- Enter pipeline is purged from one end to other – both sides
- Purged gas shall be analyse for presence of acetylene.

iv) If any welding/cutting or acetylene pipelines, same shall be pressure tested as per **point 11 of IPSS:1-06-033-97.**

v) Isolated acetylene line shall be purged with nitrogen.

ANNEXURE-I

1. BRIEF DESCRIPTION :

9. PURPOSE :

10. DATE AND DURATION :

11. EXECUTING DEPARTMENT :
NAME OF THE COORDINATOR

12. EFFECTS OF SHUT DOWN :

13. NO SUPPLY OF ____GAS _____ HOURS TO THE FOLLOWING DEPARTMENT:

1.
2.
3.
4.
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14. PREPARATORY JOBS : LIST AND STATUS /PLAN

15. DETAILS OF ACTIVITIES :

Sl. NO.	ACTIVITIES	DURATION		RESPONSIBILITY
		FROM	TO	
1.	Obtaining clearance from consumer			
2.	Clearance or shut down			
3.	Banking/isolation of valves			
4.	Depressurization			
5.	Purging			
6.	Analysis			
7.	Clearance for gas cutting/welding			
8.	Job list			
9.	Pressurisation for leak testing			
10.	Pressurisation for pressure testing			
11,	Purging			
12.	Depressurisation			
13	Debanking			
14.	Charging			
15.	Clearance to consumer			